

## Models for the statistical analysis of trends in rural tourism activity in Romania

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**Abstract** In Romania, the transition to a market economy led to restructuring in all fields, triggering multiple socio-economic implications, political and cultural. The stress of urban life has increased, there was a high degree of urbanization and environmental pollution and reduced working week. These changes have affected tourism, holiday destinations for changes to pro-active, run in nature, with positive implications and deep rural tourism activity. Temporary return to nature, the simple way of life, is a motivation for all age groups, sex, socio-professional, representing the result of the tendency of conservation, health, physical and spiritual. Valences rural environment is a big advantage that reaches more profound connotations due to context menus in the current social and economic life at national and international level. These arguments are studying the circumstances prevailing trends in rural tourism activity in Romania, which are described and analyzed in this paper based on the data taken from TEMPO database of the National Institute of Statistics.

**Key words** rural locations, tourists, accommodation, tourism, overnight stays

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### Introduction

Rural tourism development occurs as a consequence of the natural environment in terms of restricting the planet urbanization, pollution, congestion human, physical and mental stress specific to a modern existence. Thus, rural tourism can be considered as a therapy and relaxation necessary for "recharging" modern man in space and pleasant and reasonably priced. The whole local economy, rural tourism is defined as "a form of tourism exploitation of rural areas by exploiting natural resources, cultural and historical values and traditions of agricultural products, the branded products with regional identity, and specifically ethnographic and cultural, designed to meet the needs of consumers in respect of accommodation, food, leisure, entertainment and various services".

The practice of rural tourism involves the following items:

- existence of a countryside rich in tradition with a beautiful natural environment;
- interested people to practice such activity;
- services provided by these people: accommodation;
- existence of a material base (involving transport and access routes) and an appropriate legislative framework in order to drive people to practice such activities.

Agritourism is a particular form of rural tourism with a higher degree of complexity, including both tourism activity itself (accommodation, hostel, services, sports, entertainment, etc.) and economic activity, usually agriculture practiced by owner tourists (production activities, agricultural products processing and marketing of their household).

### Methodology of research

At present, in Romania there are mainly two types of tourist accommodation structures: guesthouses and agritourism locations. The major forms of accommodation are legislatively recognized by the national approval rural accommodation structures in our country, their record being found as statistical data in the tourism publications as the number of rural locations.

Step collection, systematization and presentation of statistical data required measuring the activities carried out within the tourism sector, and thus rural tourism requires the establishment of observation units and purpose and periodicity of statistical observation and data collection sources specific kind of object. The collection, systematization and presentation of statistical data on the activity of the rural tourism is followed by one that includes their processing and analysis of results. Processing of information collected and systematized can be run only in defining and implementing a system of indicators suitable for this type of tourism. The indicators used in the analysis of rural tourism activity is presented as a sub-system of indicators applied detached from tourism in general, and is customized according to the activities carried out by practicing this form of tourism.

This paper has propose a analysis of the main indicators of rural tourism activities, among which remember: total number of agritourism locations, tourist accommodation capacity in operation, number of tourists staying in agritourism locations and the number of overnight stays, the data being collated in the years series for the period 2000 – 2013.

### Results and discussions

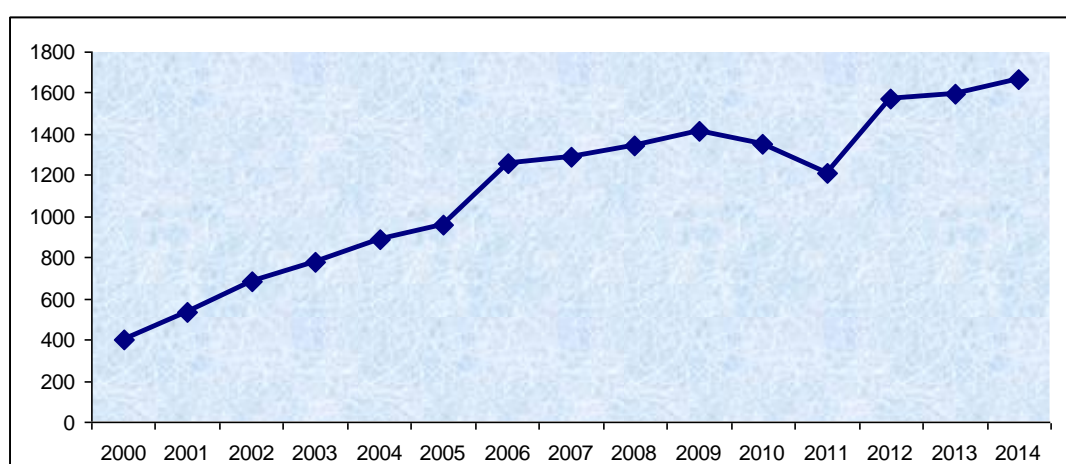
**1. Number of agritourism locations** considered vital indicator for the development of rural tourism activities, taking into account that no rural tourism activity can take place without the existence of a base of tourists.

**Table 1 – Total agritourism locations in Romania during 2000-2013**

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
400	536	682	781	892	956	1259	1292	1348	1412	1354	1210	1569	1598

data source: Database TEMPO - National Institute for Statistics

The analysis of the number of agritourism locations, based on the data presented in table 1 and shown in figure 1, shows a general trend of increase in rural tourist accommodation structures in Romania during 2000 – 2013, with the exception of 2010 and 2011 when it was declined by 4.2 % and 16.7 % compared to 2009. The growing demand for rural tourism has positively influenced the practice concerns tourism managers and investors, meaning their reorientation towards this form of tourism activities. This is the main argument that highlights the average increase in the number of agritourism locations in Romania with 17.64 % for the period 2000 – 2009, 19.8 % respectively for the period 2012 – 2013.



**Figure 1. Evolution of the number of agritourism locations in Romania during 2000 – 2013**

The general trend of increasing trend is evidenced by summarizing systematic variations and rhythmic change unwound period. Estimating the trend is actually a trend adjustment process for applying different methods, depending on the manifestation: linear, parabolic, exponential, hyperbolic etc. Setting

adjustment function, and hence the regression function parameters, determining the essence and trend analysis of the studied phenomenon.

**Table 2 – Linear model evolution analysis of the agritourism locations in Romania**

<i>Regression Statistics</i>	
Multiple R	0.924382
R Square	0.854482
Adjusted R Square	0.825378
Standard Error	54.61789
Observations	7

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	87584.14	87584.14	29.35997	0.002899
Residual	5	14915.57	2983.114		
Total	6	102499.7			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-111533	20643.63	-5.40276	0.002936	-164599	-58466.5
Anul	55.92857	10.32181	5.418484	0.002899	29.39555	82.46159

As can be seen in table 2, using regression method allows to estimate parameters by the method of least squares, setting the linear regression equation:

$$y = 156.7857 + 55,92857t.$$

The regression coefficient indicates an average increase from year to year the number of agritourism locations with 55.92857 units. Direct and strong relationship is shown in Table 2 the correlation value ratio  $R = 0.924382$

Validation of the model to be acceptable as a result of the application of the Fisher test "F" for the linear regression and Student test "t" to confirm the function percentages:

$$F_{cal} = 92,49264 > F_{0,05;1,5} = 6,61 \text{ (Fisher test)}$$

$$t_{cal} = 9,617309 > t_{0,025;5} = 2,571 \text{ (Student test)}$$

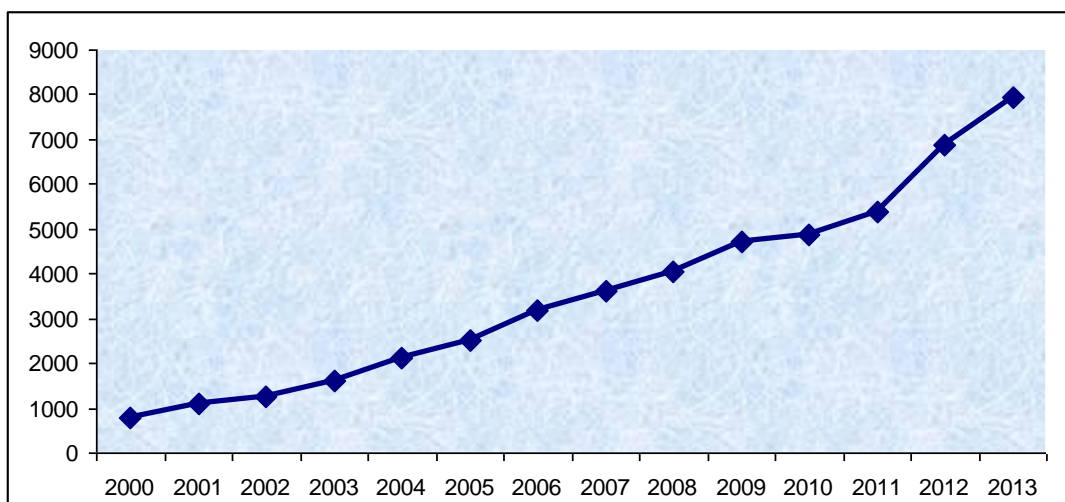
The result of analysis of the number of seats offered by agritourism locations in Romania during 2000-2013, as the capacity of existing accommodation indicates an upward trend more than the number of units of rural tourism, due to the process of sustainable development which joins and this type of tourism.

2. **Tourist accommodation capacity** in function represents the number of beds available to tourists by tourist accommodation, considering the number of days in the period considered open units. It is expressed in places-days. In the analysis is excludes seats rooms or units temporarily closed for lack of tourists, for repairs or other reasons. Proper analysis of the evolution of accommodations in service of agritourism locations in Romania begins with a graphic form of waveforms (chart 2) by the data presented in table 3.

**Table 3 – Tourist accommodation capacity into operation of agritourism locations in Romania (places - days)**

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
805.6	1105.7	1270.5	1614.5	2132.0	2528.3	3188.4	3625.6	4038.9	4735.5	4891.9	5378.4	6864.9	7932.6

data source: Database TEMPO - National Institute for Statistics



**Figure 2. Trend of accommodation capacity in operation of agritourism locations in Romania in the period 2000 – 2013**

Trend of this indicator, based on data in table 3 and chart 2 indicates, overall, an increase in service capability accommodation of agritourism locations in Romania, in the period 2000 – 2013. This increase is the result of job-day efforts of the people involved in the business of agritourism locations in order to provide tourists as many seats in the 365 days of the year. Much better reflects these efforts by the results obtained following the application of linear regression method.

**Table 4 – Linear model analysis for the evolution of the number of accommodations in agritourism locations in operation in Romania**

<i>Regression Statistics</i>	
Multiple R	0.98584
R Square	0.971881
Adjusted R Square	0.966258
Standard Error	49.39462
Observations	7

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	421646.3	421646.3	172.818	4.55E-05
Residual	5	12199.14	2439.829		
Total	6	433845.4			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-244903	18669.42	-13.1179	4.6E-05	-292894	-196912
Anul	122.7143	9.334706	13.14603	4.55E-05	98.7187	146.7099

Regression method used on the basis of the data in Table 4.6, has led to evidence of the trend of increasing the linear trend. Right of linear regression  $y = 157.5714 + 122,7143t$ , indicates an average annual increase of accommodation capacity in operation with 122.7143 thousand job-days.

Successive changes of the indicator studied, during 2000-2013, are highly dependent on the evolution of time, the link is very strong direct ( $R = 0.98584$ ) and that influences the rate of 96.6258 % accommodation capacity in operation. Validation of the model as being acceptable (table 4) as a result of

the application of the Fisher test is "F" for the linear regression and test Student "t" to confirm the function percentages:

$$F_{cal} = 127,818 > F_{0,05;1,5} = 6,61 \text{ (Fisher test)}$$

$$t_{cal} = 13,14603 > t_{0,025;5} = 2,571 \text{ (Student test)}$$

In terms of progress accommodation capacity in operation, these results is justified by the attitude of the owners and managers of rural tourism, leading and coordinating activities so that the tourist reception to operate at full capacity, maintenance and repair services quality of their running into other forms and coordinated than other types of units within general tourism.

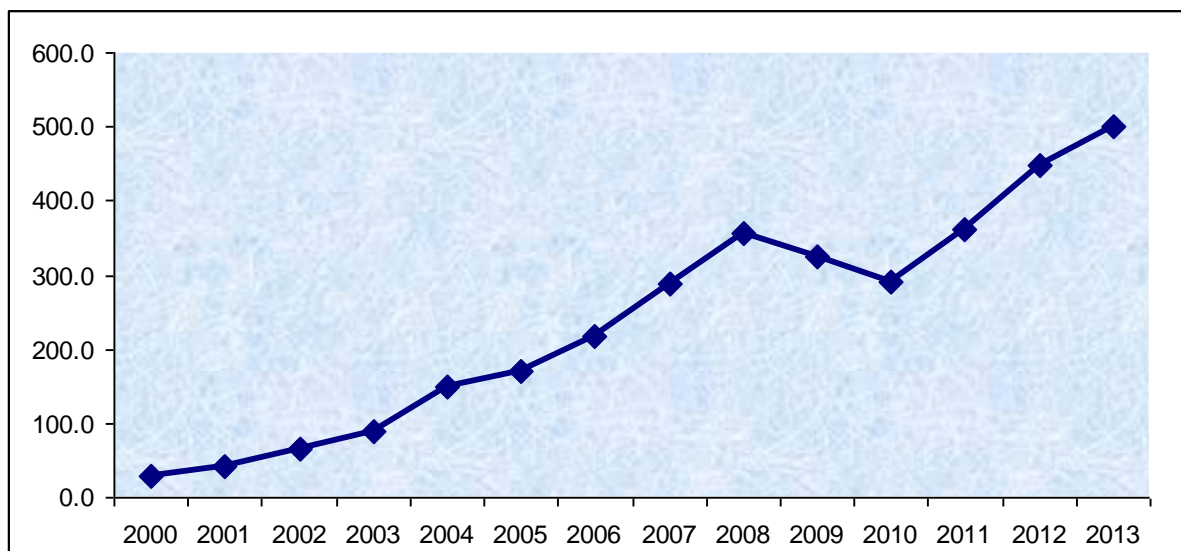
3. **The number of tourists staying in agritourism locations** includes all persons (domestic and foreign) traveling outside the city in which they reside for a period less than 12 months and spend at least one night in such a tourist accommodation unit visited areas of the country; main reason for the trip is other than that of gainfully employed in the places visited. Studying the evolution of the number of tourists staying in agritourism locations in Romania is performed based on the data (table 5), whose registered fluctuations from one year to another, capture the trend in the period 2000 – 2013.

**Table 5 – The number of tourists staying in agritourism locations of Romania (thousand persons)**

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
28.2	41.7	64.8	89.4	149.1	170.2	217.0	288.5	357.6	325.7	289.9	360.7	447.1	501.7

data source: Database TEMPO - National Institute for Statistics

The trend of the evolution of the number of tourists show follows the rural tourism indicators for the purposes of recording sustained growth. This increase is more pronounced in fixing the average 53.21 % per year, with extensions of and demand for this form of tourism consumption.



**Figure 3. Trend of the number of tourists which were staying in agritourism locations of Romania in the period 2000 – 2013**

Form waveforms of figure 3 suggests general trend in linear growth in the number of tourists arriving in agritourism locations in Romania between 2000 – 2013, confirmed by applying linear regression. The exception is the period 2009 – 2010 when we notice a decrease in the number of tourists, explaining the economic crisis existing at that time.

**Table 6 – Linear model for evolution of the number of tourists which were staying in agritourism locations**

<i>Regression Statistics</i>						
Multiple R	0.963583					
R Square	0.928493					
Adjusted R Square	0.914191					
Standard Error	3348.686					
Observations	7					
<i>ANOVA</i>						
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	1	7.28E+08	7.28E+08	64.92284	0.000477	
Residual	5	56068479	11213696			
Total	6	7.84E+08				
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-1E+07	1265685	-8.04363	0.00048	-1.3E+07	6927154
Anul	5099.107	632.8421	8.057471	0.000477	3472.337	6725.877

From the information calculated and presented in table 6, the right of linear trend showed a tendency to increase the number of tourists arriving in agritourism locations is:  $y = 2221.964 + 5099,107t$ .

Regression coefficient determined as a result of applying the method of least squares, we show from one year to another, an average increase in the number of tourists 5099.107 people, which suggest a growing trend. This trend indicates strong direct link between the number of tourists visiting the tourist reception in rural and time factor by linear regression value ratio of 0.963583, the influence of that factor being the 91.4191 %.

Application test Fisher "F" for the linear regression and test Student "t" to confirm the percentage function (table 6), have resulted in validation of the model to be acceptable:

$$F_{cal} = 64,92284 > F_{0,05;1,5} = 6,61 \text{ (Fisher test)}$$

$$t_{cal} = 8,057471 > t_{0,025;5} = 2,571 \text{ (Student test)}$$

**4. Number of overnight stays** is the total nights for which a person is registered in a tourist accommodation unit, whether or not physically present in the room. Number of overnight stays is directly influenced by the number of tourists arriving in agritourism locations and indirectly through touristic offer, not so much by its existence, but especially the quality of services provided to tourists.

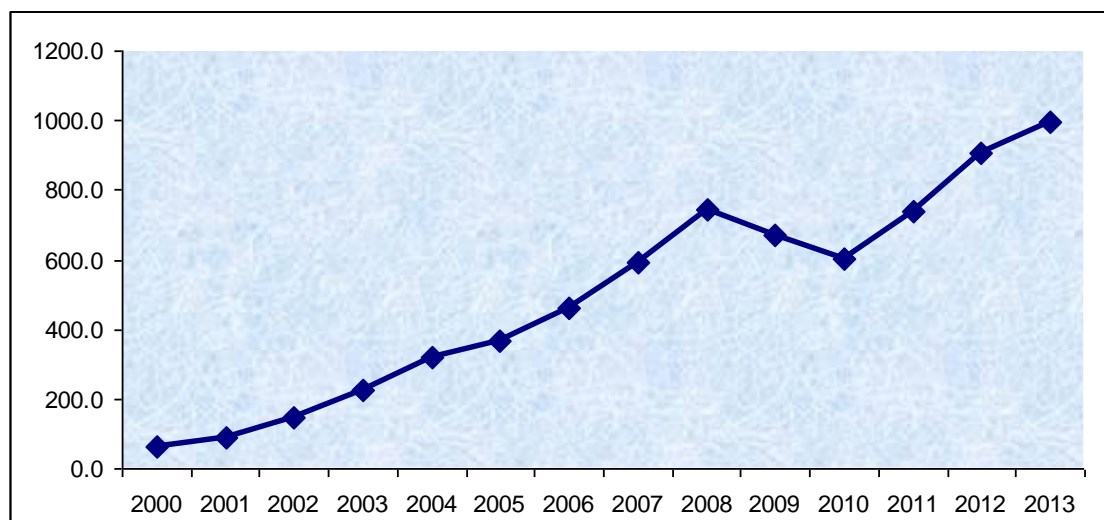
Further analysis through the development of rural tourism activity manifest demand during 2000-2013 envisages studying changes in the number of overnight stays of agritourism locations in Romania. In this context, the data recorded on the number of overnight stays in agritourism locations of Romania (table 7), their graphic representation (chart 4) and the results obtained by applying statistical methods (table 8) are the result of the above influences. The upward trend influencing factors were determined as a change in the same direction to increase the number of overnight stays.

**Table 7 – Number of overnight stays in agritourism locations of Romania (thousand nights)**

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
64.6	88.3	144.1	225.4	321.2	366.0	459.3	592.3	743.4	673.2	604.6	741.4	906.5	996.5

data source: Database TEMPO - National Institute for Statistics

After declining slightly oscillations recorded in 2009 – 2010, explain the economic crisis of the time, there is a tendency upward shift to sharp and abrupt increase in the coming years, the annual average is placed around 45 %.



**Figure 4. Trend of the number of overnight stays in agritourism locations of Romania in the period 2000 – 2013**

Building waveforms (chart 4) also suggests an increase in the number of overnight stays registered broad and linearity of the trend. This trend is confirmed by using simple regression model, which allows the method of least squares. It is one of the methods on which parameters were estimated by linear regression equation, based on data on the number of overnight stays in the agritourism establishments of the period 2000 – 2013 (table 8):

**Table 8 – Linear model for evolution of the number of overnight stays in agritourism locations of Romania**

<i>Regression Statistics</i>	
Multiple R	0.905795
R Square	0.820464
Adjusted R Square	0.784557
Standard Error	18201.12
Observations	7

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	7.57E+09	7.57E+09	22.84961	0.00497
Residual	5	1.66E+09	3.31E+08		
Total	6	9.23E+09			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-3.3E+07	6879379	-4.77289	0.005002	-5.1E+07	-1.5E+07
Anul	16442.14	3439.688	4.780127	0.00497	7600.159	25284.13

Applying the method of calculation involved the creation of which we notice that in the period under review, the average increase from one year to another is 16451.21 nights. And the number of overnight stays, the time during which the known mutations studied indicator successive annual is also a

factor considered a pretty big influence 90.6336 % by weight obtained, given the coefficient of determination.

The value of this factor led to the determination of the ratio of correlation, whose outcome reveals a direct link 0.785733 and powerful. Validation of the model presented in table 8 as acceptable is all the result of applying the Fisher test "F" test and Student "t" to confirm rates it:

$$F_{cal} = 23,00249 > F_{0,05;1,5} = 6,61 \text{ (Fisher test)}$$

$$t_{cal} = 4,796061 > t_{0,025;5} = 2,571 \text{ (Student test)}$$

## Conclusions

The analysis presented in this paper can be seen as changes in the number of tourists has experienced the largest increase compared to the number of tourist accommodation structures or existing accommodation capacity in operation, due to more pronounced manifestation thereof, meaning change preferences leisure.

Although the number of tourists arriving in agro hostels has evolved quite pronounced, average exceeding 50 %, even though their period of stay is left to be desired. Once away from the stress of city life, preferred to stay as many days in these places. The trend of increasing assimilation is justified by the number of tourists. However, the average growth rate close to the number of tourists, could not be exceeded due to the financial statements and reduced purchasing power, facing the tourists in the current economic climate.

The evolution of rural tourism activity is not reflected only by analyzing fluctuations in supply indicators that highlight the situation: number of tourist accommodation rural accommodation capacity of existing accommodation capacity in operation. Two other indicators join the first three, for the whole picture changes facing rural tourism activity. They capture the state of rural tourism demand and are represented by the number of tourists arriving in rural tourism establishments of Romania corresponding to those units and the number of overnight stays for the period 2000-2013. Demand for rural tourism industry has increased from year to year due to changing conditions of life and mentalities regarding the practice of forms of tourism including tourist presence in nature and active participation of specific business processes.

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