THE IMPORTANCE OF AGRICULTURAL PRODUCTION FOR THE DEVELOPMENT OF AGROTOURISM ACTIVITIES IN PRAHOVA COUNTY, ROMANIA

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Abstract

This paper aims to present the evolution of agriculture in Prahova County, in the period 2014-2018, analyzing in particular the production of cereals, fruits and vegetables without omitting animal husbandry and the production of milk and eggs. In order to highlight the main trends of agricultural production in Prahova County, the areas cultivated with cereals for grains, oil plants, potatoes, vegetables, as well as the areas occupied by orchards, vineyards and livestock were subjected to analysis. Grain cereals occupy an average of 95,502.4 hectares, being the largest area. This is followed by the average of oil plants with 27,156.6 hectares, followed by vegetables with an average of 4,230 hectares and potato cultivation with an average of 2,530.4 hectares. For the other crops analyzed, there were increases in maize, fodder, barley production and decreases in rye production. The analysis of fruit and vegetable production highlighted the fact that it belongs largely to private property, this being an asset for the development of slang tourism in Prahova County. Analyzing the milk production, a decreasing trend was found over the entire analyzed period.

Key words: *agricultural production, evolution, agrotourism, cultivation of plants, vegetables, Prahova County*

INTRODUCTION

Taking into account the current trends of the international market regarding the demand for agrotourism products and Romania's potential in tourism, the country has a competitive advantage that will bring some well-known tourist areas to the attention of agrotourism lovers [4].

If development in this direction will be achieved at high levels, the development of agrotourism can be a chance to capitalize the natural and anthropogenic tourist resources in a sustainable way in a long run [2].

Agrotourism can lead to the conservation of rural nature while providing the opportunity for the development of local communities. Development strategies in this regard can be developed with the basic idea of the local perspective of existing agrotourism destinations that have great potential for future development [5].

Due to the link established between agrotourism and agriculture, environmental protection and infrastructure, the major importance for the long-term development of the rural area can be a basic support for the development of new businesses in the private sector leading to a local development of the communities involved [8].

The results of these developments could be easily materialized in increasing the incomes of the rural population, in improving the structure of expenditures, involving specialized investments and developing transport infrastructure, along with the creation of new activities resulting from local trade due to local population and visitors [9].

The modernization of the rustic space, the arrangement of some agrotourism routes, the realization of repairs and the endowment with the household equipment are some of the benefits brought by this objective [7] [9].

The fact that agrotourism involves the social factor in the village environment it aims the use of civilizational nature, culture and education and the development of friendly links between the local community and tourists but also exchanges of experience and progress.

The study took into account the possibilities of agricultural development in Prahova County as well as the possibilities offered by private households for the supply of cereals, vegetables, fruits and livestock for milk collection [1] [3].

For agrotourism, agricultural products are a basic point in supporting the development of the activity. That is why it is necessary to analyze them at the zonal level to determine, along with the other important points necessary for the development of agrotourism, the basis of supporting tourists in holiday destinations whatever they are, a natural setting of agritourism farms [10].

Lately, it more and more discussed about the ecosystem services that a region offers for tourists from an agricultural, tourist and cultural point of view. That is why it is needed to determine the resources of an area meant to contribute in the future to its development from an agrotourism point of view [11].

In this context, the purpose of the paper is to identify the current stage of development of agricultural production in Prahova County using some specific indicators looking for resources which could bring to the development of agrotourism.

MATERIALS AND METHODS

For this purpose, the research was based on the data obtained in the economic context, using secondary information to further create a necessary basis for the implementation of a field research. The information obtained in this way allows the understanding of the studied phenomena.

The collection of secondary information involves a documented activity based on the collection of reliable, objective and valid data from reliable sources. That is why the original statistical sources were provided by the National Institute of Statistics [6].

The main methods used in this study are statistical processing, for the indicators of the mean, standard deviation and coefficient of variation related to each group of indicators for the analyzed period.

RESULTS AND DISCUSSIONS

Within the diversity of relief units Prahova County has a wide variety of soils, the mountainous area is characterized by the presence of prepodzols and podzols, in the area of hills there are luvosols, rendzine, eutricambsols, distrambosols that are specific to meadows, fodder crops and orchards and in the field could be found chernozems, phaeoziomes and preluvosols that favor the cultivation of cereals.The arable lands has a share of 3.87% for class I of very good quality from the total agricultural area of the county. Class II of good quality arable land is 21.14% of the total county agricultural area. Class III of arable land with a moderate limit for cultivation is 30.5% of the total county agricultural area.

Class IV of arable land with severe limitations occupies a percentage of 29.06% and class V of extremely limited arable land occupies 15.45% of the total agricultural area of Prahova County.

Table 1 shows the evolution of the agricultural area of Prahova County in the period 2014 - 2018.

Table 1. Agricultural area in Prahova County between 2014 – 2018

Year	Total area / hectares
2014	138,321
2015	140,109
2016	142,824
2017	142,118
2018	142,403
Mean	141,155
St. Deviation	1,897.11
Variation coefficient (%)	1.34

Source: author's own research.

Table 1 shows an increasing trend recorded by the annual agricultural area from 138,321 hectares in 2014 to 142,824 hectares in 2016, after which it decreases to 142,118 hectares in 2017 and then to increase to 142,403 hectares in 2018. One cause of this decrease noticed in 2016 is the decline of cereal crops for berries and potatoes. It can be observed that the average of the crops for the analyzed period is 141,155. It can be seen that the average total area of crops in Prahova County, expressed in Hectares is 141,155 and the standard

deviation is 1,897.11. The coefficient of variation has the value of 1.34 which means a homogeneous series whose average is

representative. Table 2 shows the main crops in Prahova County for the analyzed period.

Table 2. The main agricultural crops in Prahova County between 2014 – 2018

Year	Grain cereals	Potatoes	Oily plants	Vegetables
2014	98,862	2,696	21,426	4,488
2015	98,279	2,595	24,512	4,342
2016	100,673	2,547	24,159	4,119
2017	88,741	2,392	33,323	4,097
2018	90,957	2,422	32,363	4,104
Mean	95,502.4	2,530.4	27,156.6	4,230
St. Deviation	4,735.16	112.05	4,773.89	158.11
Variation coefficient (%)	4.95	4.78	17.57	3.73

Source: author's own research.

From the data presented in Table 1, the largest cultivated area of cereals is observed. This is followed by oil plants, vegetables and potatoes. During the analyzed period, grain cereals registered an evolution of decreasing cultivation in 2015 compared to 2014 with 583 hectares. For 2016, the cultivation of grain cereals registers an increase of 2,394 hectares compared to 2015. In 2017, the area of cereal crops decreases by 11,932 hectares compared to 2016 and then in 2018 to increase again by 2,216 hectares. Regarding the potato crop, there is a decrease of the cultivated area in 2015 compared to 2014 of 98 hectares. This trend continues to decrease in 2016 by 48 hectares compared to 2015. In 2017 there is the lowest area cultivated with potatoes in the entire analyzed period of 2,392 hectares being with 155 hectares smaller than the one cultivated in 2016. For 2018, it will increase by 30 hectares. The cultivation of oil plants annually registers significant increases

starting from 21,426 hectares in 2014 to 33,323 hectares in 2017, after which in 2018 it is cultivated with 960 hectares less. Vegetables record an annual decrease in cultivated area. In 2014 they occupied 4,488 hectares, in 2015 the cultivated area decreased by 146 hectares, in 2015 the cultivation of vegetables continues to decrease by 223 hectares compared to 2015 and in 2017 by 22 hectares compared to 2016. In 2018 notes an increase in the area cultivated with vegetables by 7 hectares compared to 2016. The analysis of statistical indicators shows the highest specific average of the main agricultural crops in the category of grain cereals, this being followed by that of oil plants, vegetables and potatoes. The coefficient of variation is below 35% which indicates homogeneous series for the main agricultural crops in the analyzed period. The average is representative.Table 3. shows the main grain crops for grains by categories.

Table 3. Grain grain cultivation by categories between 2014-2018

Year	Wheat	Maize	Rye	Barley
2014	38,661	51,524	121	7,258
2015	36,806	54,392	43	5,845
2016	38,487	54,324	22	6,662
2017	33,205	49,444	0	5,071
2018	35,688	50,090	0	4,225
Mean	36,569.4	51,954.8	37.2	5,812.2
St. Deviation	2,247.44	2,319.50	50.13	1,212.66
Variation coefficient (%)	6.14	4.46	134.75	2.17

Source: author's own research.

From Table 3, it can be seen that the largest area cultivated with cereals belongs to corn

crops with over 50,000 hectares, followed by wheat with over 30,000 hectares, barley and

barley with over 4,000 hectares. Rye occupies the last place in the cultivation of grain cereals, being declining every year and in the last two years 2017 and 2018 not being cultivated. For the analyzed period it is observed the largest cultivated area with corn was registered in 2015 of 54,392 hectares and the smallest of 49,444 hectares was cultivated in 2017. For wheat the largest cultivated area was achieved in 2014 with 38,661 hectares. This remained constant for the entire analyzed period, the values increasing or decreasing not being significant year by year.

Regarding Barley and Barley, we can see the decreasing trend of cultivated areas starting from 7,258 hectares in 2014 to 4,225 hectares in 2018. The weakest crop is Rye, which in 2014 was cultivated on 121 hectares, in 2015 was cultivated on 43 hectares and in 2016 it was cultivated on 22 hectares after which its cultivation stopped. There is a higher average crop of cereal grains for maize, followed by wheat and barley. The coefficient of variation indicates values below 35% for them, which shows that there is a degree of homogeneity of the respective grain cultivation series, the average is representative, while for rye it is found that the series is inhomogeneous. Table 4. shows the agricultural vegetable production for the period 2014 - 2018.

Table 4. Vegetable agricultural (t) production of Prahova County between 2014 – 2018

Year	Maize	Wheat	Barley	Rye
2014	225,314	133,173	23,715	197
2015	185,874	136,743	20,192	286
2016	209,229	157,447	25,565	77
2017	287,216	152,335	19,938	0
2018	325,727	128,080	15,364	0
Mean	246,672	141,555.6	20,954.8	112
St. Deviation	57,982.86	12,686.14	3,928.91	126.3
Variation coefficient (%)	23.5	8.96	18.74	112.76

Source: author's own research.

Table 4. shows that the highest maize production in 2018 was 32,5727 tons, with 100,413 tons more compared to the base year 2014. For the analyzed period, the maize production trend is decreasing for 2015, after which it is increasing year by year, two years. Wheat production registers an increase until 2016 by 24,274 tons compared to 2014, after which it decreases by up to 29,367 tons in 2018. According to the statistical data processing, the highest average of the maize production recorded for the analyzed period is noticed, followed by the wheat and barley production, while the section production registers the lowest average for this time. The coefficient of variation indicates a homogeneous series for the production of corn, wheat and barley, the average is representative and inhomogeneous for the production of rye whose environment is not representative. Figure 1 shows the total fruit production and that collected from the private property of Prahova County for the period 2014 – 2018.
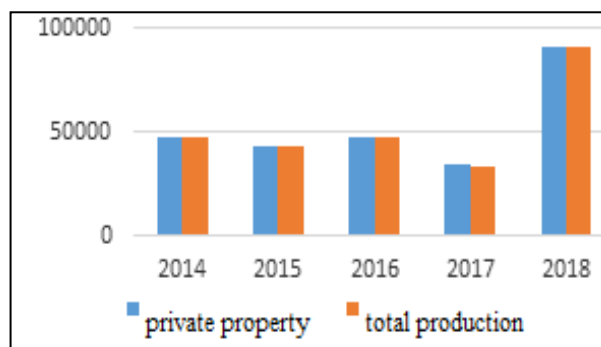

Fig. 1. Graph of the evolution of fruit production in Prahova County between
Source: author's own research.

As can be seen from Figure 1. fruit production in Prahova County is mostly private property. This is a main asset for the development of agrotourism at county level being one of the basic resources for this form of tourism. In Table 5 the situation of fruit production by categories for the period 2014-2018 is presented.

Table 5. Fruit production in Prahova County by categories (t) 2014 - 2018

Fruits (t)	2014	2015	2016	2017	2018
Plums	23,499	21,312	27,780	18,010	50,207
Apples	13,712	14,366	10,966	7,801	30,041
Pears	3,503	2,434	2751	2,256	2,766
Peaches	580	496	668	707	741
Cherries	2,686	2,320	2,308	1,901	3,086
Apricots and greens Nuts	1,506	1,186	1,306	1,373	1,462
Nuts	1,137	1,297	1,367	1,745	2,202
Strawberries	28	22	16	0	0
Other fruits	1,058	96	171	148	124
Mean	5,301	4,836.55	5,259.22	3,771.22	10,069.88
St. Deviation	7,998.58	7,621.54	9,082.89	5,824.21	17,802.05
Variation coefficient (%)	150.88	157.58	172.7	154.43	176.78

Source: author's own research.

It can be concluded that the most important fruit production in Prahova County is occupied by plums, in 2018 it reached 50,207 tons compared to 2017 when their lowest production of 18,010 tons was recorded. In second place is the production of apples with a value of 30,041 tons in 2018. The lowest production of apples stands out in 2017 with 7,801 tons compared to 2014 when it was 13,712 tons. On the third place of fruit production at county level is observed the place occupied by pears. The highest pear production is noted in 2014, of 3,503 tons. It decreases over the analyzed period year by year to 2,766 tons in 2018. The production of cherries and cherries is increasing in 2018 to 3,086 tons compared to the base year 2014 when it was 2,686 tons. The lowest production of cherries and sour cherries is recorded in 2019 with a value of 1,901 tons. Apricot and Vegetable production is declining over the analyzed period while Walnuts record increases in production from year to year from 2014 to 1,137 tons until 2018 when it reaches the value of 2,202 tons.

It is possible to observe a decreasing evolution of the strawberry production from 28 tons in 2014 to 16 tons in 2016 after which the values are no longer found in the productive statistics.

The same decreasing trend is noticeable for the category of other fruits if in 2014 there were 1,058 tons of production in 2018 reaching 12 tons. The highest average fruit production is obtained in 2018 and the lowest is obtained in 2017. The coefficient of variation has values above its maximum limit, which indicates inhomogeneous data series therefore the average is not representative. Table 6 presents data specific to the number of animals expressed in heads at the level of Prahova County for the analyzed period.

Table 6. The herd of animals private in Prahova County 2014 – 2018

(Heads)	2014	2015	2016	2017	2018
Cattle	37,742	38,819	37,654	38,848	37,099
Swine	96,844	98,106	96,594	84,272	79,507
Sheep	137,002	138,268	136,955	136,570	135,307
Goats	35,281	36,807	38,137	39,053	39,063
Mean	76,717.25	78,000	77,335	74,685.75	72,744
St. Deviation	49,245,54	49,222.27	48,430.42	46,459.99	46060.98
Variation coefficient (%)	64.19	63.1	62.62	62.2	63.31

Source: author's own research.

For the analyzed period the herd of animals from Prahova County shows us that sheep are in the first place in their breeding. Sheep have the highest number of 38,848 heads in 2017 compared to 2014 when they amounted to 37,742 heads. A good year in which the

number of sheep's heads was over 37,742 is also 2015 with 38,819 heads. For 2016, their situation shows a decrease of up to 37,645 heads, a trend that is maintained for 2018 when their number reaches 37,099 heads. The second place for the number of animals in the county is occupied by pigs. Their evolution shows an increase in the number of heads for the year 2015 by 1,262 heads more than in 2014. After this year the number of pigs is decreasing by 1,512 heads for the year 2016 and 12,322 heads in the year 2017 compared to 2016. For the year 2018 the number of heads of pigs decreased by 4,765 heads. The analysis of the number of animals for cattle

for the period 2014-2018 shows a constant trend of over 37,000 heads with slight annual fluctuations of annual increase or decrease while for goats there is an increase year by year from 35,281 heads for the year 2014 to 39,063 heads for the year 2018. You can see the highest average growth of herds for the period analyzed for 2015 and the lowest average value for 2018. The coefficient of variation is high which indicates a heterogeneous structure of the community, the average series is not significant. Tables 7 and 8. show private agricultural production of animal origin for milk, wool and honey.

Table 7. Private agricultural production of animal origin for milk 2014 – 2018

(thousand hectoliter)	2014	2015	2016	2017	2018
Milk	924	899	913	809	812
Cow's milk and buffalo	778	762	790	678	690
Mean	851	830.5	851.5	743.5	751
St. Deviation	103.23	96.87	86.97	92.63	86.26
Variation coefficient (%)	12.13	11.66	10.21	12.45	11.48

Source: author's own research.

Table 8. Private production of wool and honey in Prahova County 2014 – 2018

(t)	2014	2015	2016	2017	2018
Wool	478	462	491	501	497
Honey	439	620	467	974	1018
Mean	458.5	541	479	737.5	757.5
St. Deviation	27.57	111.72	16.97	334.46	368.4
Variation coefficient (%)	6.01	20.65	3.54	45.35	48.63

Source: author's own research.

The data exemplified in Table 7 show the production of milk collected from the private sector as slightly decreasing for the analysis period. In 2014 it amounted to 924 thousand hl and in 2015 it decreased by 25 thousand hl. For 2016 there is an increase of a 4 thousand hl compared to 2015 and in 2017 there is a decrease of 104 thousand hl compared to 2016. For 2018 milk production shows a decrease of 3 thousand hl compared to 2017. We notice the increasing trend of wool production for the period 2014-2017 starting from 478 tons to 501 tons, after which there is a slight decrease of 4 tons in 2018.

The average milk production in the private environment of Prahova County is the highest in 2016 and the lowest in 2017.
The coefficient of variation is below 35% which indicates homogeneous series for which the average is representative. In terms of honey production, the trend is fluctuating year from 439 tons for 2014 to 620 tons in 2015 after which it decreases to 467 tons in 2016 and then to record double increases for 2017 to 974 tons and 1,018 tons respectively in 2018. The average private production of wool and honey registers the highest value in 2018 and the lowest value in 2014.
The coefficient of variation indicates a high degree of homogeneity for 2015, 2017 and

2018. For the period 2014 - 2016 the average is representative while for the period 2017-2018 the mayoralty is not representative.

Table 9 shows the evolution private egg production expressed in millions of pieces.

Table 9. Private egg production at the level of Prahova County between 2014 – 2018

(million pieces)	2014	2015	2016	2017	2018
Eggs	173	159	157	147	146

Source: author's own research.

You can see the upward trend in egg production at the county level starting from 17 million pieces in 2014 to 146 million pieces in 2018. In 2015 production decreased by 14 million pieces compared to 2014 and in 2016 it decreased by 2 million pieces compared to

2015. The decrease registered in 2018 was 1 million pieces compared to 2017. The situation of the vine crop area as a private property existing in Prahova County is presented in Table 10.

Table 10. Area of fruit vineyards in Prahova County 2014 – 2018

(hectare)	2014	2015	2016	2017	2018
Vine on the fruit	8,409	8,139	7,324	7,293	7,121
Grafted vines	7,343	7,076	6,261	6,230	6,136
Hybrid	1,066	1,063	1,063	1,063	985
Mean	5,606	5,426	4,882.66	4,862	4,747.33
St. Deviation	3,967.71	3,815.66	3,350.35	3,332.68	3,295.28
Variation coefficient (%)	70.77	70.32	68.61	68.54	69.41

Source: author's own research.

From the analysis of the private area occupied by the vine on the territory of Prahova County it is noted according to the decreasing trend registered every year for the fruit vineyards pronouncing from 8,409 hectares in 2014 to 7,121 hectares in 2018. In 2015, the area cultivated with vines per fruit decreased by 270 hectares. In 2016 compared to 2015 the decrease was 815 hectares and in 2017 compared to 2016 this decrease was 31 hectares. In 2018, the decrease of the area occupied by the vine was 172 hectares compared to 2017. This decreasing trend is

also reflected in the evolution of grafted and hybrid vineyards. The share of grafted fruit vines is higher compared to that of hybrid fruit vines. The area of fruit vineyards in Prahova County has the highest average in 2016 and the lowest value is for 2018. The coefficient of variation is high which indicates that the average is not significant, the serial structure being heterogeneous.

In the following, it is analyzed the situation of vegetable production as a whole and also by the main categories of vegetables in Prahova County and private farms (Table 11 and 12).

Table 11. Vegetable production in Prahova County 2014 -2018

(t)	2014	2015	2016	2017	2018
Private sector	57,158	55,417	48,193	49,957	47,319
Total vegetable	57,108	55,368	48,160	49,924	47,308
Mean	57,133	55,392.5	48,176.5	49,940.5	47,313.5
St. Deviation	35.35	34.64	23.33	23.33	7.77
Variation coefficient (%)	0.06	0.06	0.04	0.04	0.01

Source: author's own research.

As can be seen, as in the case of the other analyzes presented, the vegetable production is mostly private in Prahova County, the

difference being insignificant in terms of quantity. The trend recorded for the analyzed period is decreasing starting from 57,158 tons

in 2014 to 47,319 tons in 2018. The analysis of specific indicators for total vegetable production and that of the private sector expressed in tons, shows the highest average recorded in 2014 and its lowest value in 2018. The coefficient of variation tends to zero, the variation of the characteristic being small, the series it is homogeneous and the mean is representative.

Table 12 shows the evolution of vegetable production by product categories.

Table 12. Vegetable production in Prahova County by categories between 2014 – 2018

(t)	2014	2015	2016	2017	2018
Tomato	17,029	16,754	15,764	16,511	15,437
Dried Onions	5,697	5,106	4,267	4,292	4,039
White cabbage	18,524	17,640	14,224	14,589	14,421
Mean	13,750	13,166.66	11,418.33	11,797.33	11,299
St. Deviation	7,014.04	6,994.78	6,240.91	6,570.46	6,307.83
Variation coefficient (%)	51.01	53.12	54.65	55.69	55.82

Source: author's own research.

We can see that the main place in vegetable production is occupied by white cabbage which in 2014 recorded 18,524 tons, with 4,103 tons more compared to the reference year. The decrease in the production of white cabbage every year is reflected as a decreasing trend in the other categories of vegetables, namely dried onions and tomatoes. The production of dried onions in Prahova County in 2018 decreased by 1,658 tons compared to the base year 2014. Regarding the decrease in tomato production in 2018, there are 1,592 tons less than in the base year 2014. Vegetable production for the analyzed period indicates the highest average value expressed in tons for 2014 and the lowest value is recorded in 2016. The coefficient of variation is higher than 35% which indicates that the series is not representative.

CONCLUSIONS

In conclusion, on the territory of Prahova County which occupies a percentage of 2% of the total agricultural area in Romania, the arable area is 53%. A percentage of 26% is occupied by pastures and 13% is intended for hayfields. The orchards cover an area of 5% of the total agricultural area of Prahova County of 272,834 hectares and vines of 3%. [11].

The most important crops are cereals for grains, followed by oil plants, potatoes, vegetables and fruits and grapes. From a zootechnical point of view, Prahova County provides the necessary for a number of other counties in the country for the poultry sector and the number of animals it owns, therefore the most important products of the agricultural sector are cereals followed by fruits and grapes to which milk is added. meat, abundant resources to be able to develop the base of agrotourism at zonal level.

The existence of agricultural resources in Prahova County offers the possibility of implementing agro-tourism development plans. Therefore, a number of localities can benefit from local development planning, thus contributing to the increase of the well-being and income of the population as well as to an economic growth due to the activities resulting from agrotourism.

REFERENCES

[1]Angelescu, C.E., Horoias, R., 2015, Contributions to the development of the field crops in Teisani area households, Prahova County, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 15, Issue 2, 2015, 13-16.
[2]Crețu, R. C., Ștefan, P., 2012. Agrotourism resources. Ceres Publishing House. Bucharest. p. 32.
[3]Dana, D., Chiurciu, I.-A., Voicu, V., 2017, Estimations concerning the increasing of the wheat production in Prahova County, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 17, Issue 1, 2017, 141-145.
[4]Iacob (Irimia) Constantina Cati, 2018, The importance of local development through the expansion

of agrotourism in Prahova County, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 18, Issue 3, 2018, 171-178.

[5]National Strategy For The Sustainable Development Of Romania, 2030, p.21.Regional Tourism, Alias Publishing House, Bucharest, p. 41.

[6]National Institute of Statistics, http://www.insse.ro/cms/files/statistici, Accessed on May 18, 2019.

[7]Nistoreanu, P., Ghereş, M., et al, 2010, Rural Tourism. Treaty.Bucharest: C. H. Beck Publishinh House, p. 48.

[8]Otiman, P.I., 2006. Sustainable rural development in Romania. Romanian Academy Publishing House. Bucharest.

[9]Paun, F., 2014, Studies regarding the situation of rural development in Prahova County and the managerial measures which need to be taken, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 14, Issue 1, 2014, 273-276

[10]Prahova County Profile, Directorate For Agriculture And Rural Development, Accessed on May 11, 2019.

[11]Prahova County Statistics Directorate. Monthly Statistical Bulletin. Accessed on May 19, 2019.