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Conference Paper

Honey market-actuality and perspectives

Provided in Cooperation with:

The Research Institute for Agriculture Economy and Rural Development (ICEADR), Bucharest

Suggested Citation: Enache, Petruța Antoneta; Necula, Diana Maria (2022) : Honey market-actuality and perspectives, In: Rodino, Steliana Dragomir, Vili (Ed.): Agrarian Economy and Rural Development - Trends and Challenges. International Symposium. 13th Edition, The Research Institute for Agricultural Economy and Rural Development (ICEADR), Bucharest, pp. 162-169

This Version is available at:

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HONEY MARKET– ACTUALITY AND PERSPECTIVES

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Abstract: *Apiculture as a branch of agriculture bases on bee's instinct to store food supplies over consumption need. supplies that are used by the beekeeper. From the technical-scientific and socio-economic evolution point of view. it caused the increase of food and the diversity of its range. Apiculture has a very important role in the distribution of honey. but also as a vector of increasing the apiculture production by pollinating the entomophile crops. Currently. Romania situates among the countries that have a well-developed apiculture. this situation being a consequence of the large number of bee families at our disposal. of the quantity of honey that was obtained. of the diversity in apiculture production and of the results from scientific research activities and training specialists. This study presents the evolution of the main indicators regarding the evolution of the number of bee families. production and honey consumption. as well as a forecast until 2027.*

Key words: *bee family. honey. apiculture products*

JEL Ranking: Q10. Q12

INTRODUCTION

The economic importance of apiculture is given by the value and the capitalization of direct apiculture that men harvest from bee: honey. propolis. pollen grains. royal jelly. venom. caps. bee bread and wax. but also those from agricultural products that are obtained from cultivated and wild plants through pollination.

From an alimentary and sanitary point of view. honey shall be understood as the food extracted from honeycombs. when they have been capped by bees on at least $\frac{3}{4}$ of their surface. so that it avoids the penetration of larvae (brood). bee bread. bee cadavers. pieces of wax or other impurities (Bulancea. M. 2002).

Honey has been used for consumption. as well as for medicinal purposes since ancient times. However. natural honey consumption had a decline throughout some periods. especially after the Industrial Revolution (Pocol.2013).

This last aspect has been strongly influenced in a positive way on the food market due to the increase of consumer's interest in a healthy lifestyle. namely „healthy eating habits”. Moreover. numerous parents choose and search for natural products in order to provide healthy food for their children (Mărghitaș L..2008).

Besides the positive impact on health that honey has as a natural product. one of the reasons that contributed to the increase of honey consumption consists in information procured by the consumer regarding its nutritional value.

So. from a nutritional point of view honey is a natural product with a high caloric value: 320 - 330 kcal per 100 g. Regarding calories it was determined that the equivalent of 1.000 kg of honey can be the equivalent of: 1.450 kg of bread; 2.370 kg of beef; 3.930 kg of fish meat; 4.700 l of cow's milk or 6.000 kg of apples (Dezmirean D. S..2010).

Regarding Romanian population, consumers see honey as a product with multiple benefits for human health and as a part of a healthy lifestyle. This attention that honey has been paid not only locally or nationally, but also globally can be explained due to the fact that it's presented as a natural product and as part of alternative medicine. According to Pocol and collab. (2018) 1/3 consumers eat honey once a week or once a month.

MATERIAL AND METHOD

This study conducts an analysis of the honey market. the data that are used in the study present a market retrospective, because it analyses the number of bee families, productions, consumption and average purchase prices so that, by processing the series of chronological data with the help of different statistic indicators: arithmetic mean, standard deviation, variation coefficient and annual rate, those being determined with the help of the following formulas:

- arithmetic mean: $\bar{X} = \frac{\sum_{i=1}^n x_i}{n}$, where x_i - observed values; n-number of observed values

- standard deviation: $S = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{N-1}}$, where x_i - observed values; N-number of observed values. \bar{x} – average of observed values

-variation coefficient: $CV = \frac{S}{\bar{x}}$, where S – standard deviation. \bar{X} – arithmetic mean

- average annual rate: $R = [\text{radical of the order } n-1 \text{ from } (x_n / x_0)] - 1 * 100$, where x_n, x_0 – current year – previous year value.

Using *FORECAST* function, it was possible to present predictions of the honey market from Romania and by Regions of Development (2010-2027) in order to show its tendency.

FORECAST function predicts a value based on existing values across a linear tendency. *FORECAST* calculates the predictions of the future value using linear regression and can be used to predict numeric values such as sales, stocks, expenses, measurements etc.

In statistics, linear regression is an approach to shape the relation between a dependent variable (y values) and an independent variable (x values). *FORECAST* uses this approach to calculate the y value for a certain x value based on existing x and y values. In other words, for a given x value, *FORECAST* returns an estimated value based on the relation of linear regression between x values and y values.

RESULTS AND DISCUSSIONS

Analyzing the evolution of the number of bee families in Romania, we can see an increase tendency between 2010-2020 when it has been registered a maximum number of 1879611 bee families in 2020 and a minimum of 1249610 bee families in 2011. This evolution of the number of bee families has increased in 2020 compared to 2010 by 147.4% and had an annual growth rate of 4.0%. (table nr.1)

The increase of the number of bee families is due to accessing funds from national programs by purchasing biologic material necessary to repopulate apiculture livestock, which led to the growth and /or substitution of bee families following apicultural practice and implicitly to obtaining larger, healthier and more productive apiaries.

Per Development Regions we can see that at the top, with the largest number of bee families is the South-East Region with a number of 333.218 in 2020, with a difference of 180.959 bee families compared to 2010, registering an annual growth rate of 8.1%.

In the following places, in 2020 places the North-West Regions with a number of 308.674 bee families, the South-West Region Oltenia with a number of 290.283 bee families, followed by the South Region - Muntenia with 265.044 bee families and on the last place is the Bucharest – Ilfov Region with a number of 15.943 bee families.

Table 1. Evolution of the number of bee families in Romania, by Development Regions between 2010-2020

| Specification | 2010 | 2011 | 2013 | 2015 | 2017 | 2019 | 2020 | Average (nr) | Stand. Dev. (%) | Var C.* (%) | Annual rate (%) |
|---------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------------|-----------------|-------------|-----------------|
| TOTAL | 1274917 | 1249610 | 1354218 | 1392846 | 1602453 | 1843026 | 1879611 | 1484419.3 | 231995.2 | 15.6 | 4.0 |
| NORTH-WEST Region | 170269 | 162294 | 170933 | 171194 | 209867 | 294620 | 308674 | 203616.5 | 52855.3 | 26.0 | 6.1 |
| CENTRAL Region | 184046 | 185463 | 195713 | 202168 | 204403 | 223199 | 225822 | 201451.7 | 14244.7 | 7.1 | 2.1 |
| NORTH-EAST Region | 178685 | 170837 | 195333 | 198724 | 215535 | 238612 | 248639 | 202.693.0 | 25733.2 | 12.7 | 3.4 |
| SOUTH-EAST Region | 152529 | 150510 | 138325 | 138285 | 252914 | 323671 | 333218 | 199711.1 | 80750.9 | 40.4 | 8.1 |
| SOUTH Region -MUNTENIA | 193084 | 184822 | 192110 | 197903 | 227126 | 249359 | 265044 | 212184.2 | 27284.6 | 12.9 | 3.2 |
| BUCHAREST – ILFOV Region | 19207 | 17752 | 18248 | 13841 | 14092 | 16018 | 15943 | 16290.8 | 2010.2 | 12.3 | -1.8 |
| SOUTH-WEST Region OLTENIA | 197052 | 209892 | 270707 | 298033 | 312789 | 311516 | 290283 | 272968.4 | 44530.4 | 16.3 | 3.9 |
| WEST Region | 180045 | 168040 | 172849 | 172698 | 165727 | 186031 | 191988 | 175503.5 | 8056.6 | 4.6 | 0.6 |

Source: own calculations based on INSSE data. *Variation coefficient: <10 = small; 10-20 = average; >20 = large.

Using *Forecast* function we can see the future tendencies of the total number of bee families from Romania as follows:

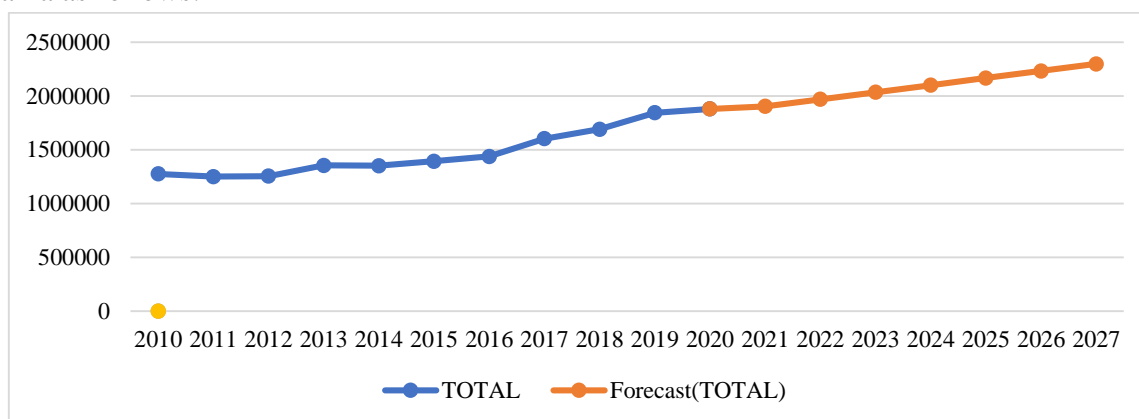


Figure 1. Tendency of total number of bee families from Romania, 2010-2027

Source: authors calculations

According to estimations it is expected for the number of bee families to increase by 2027 if this trend that has been analyzed between 2010-2020 is maintained.

The largest growth percent was held by the South-East Region in 2020 compared to 2010 and 2015 with a variation coefficient of 40.4%.

Increases with a more accelerated rate have been noticed also in the North-West Development Regions. South-West Region Oltenia respectively 26.0% and 16.3%.

In 2020 compared to previous year there have been registered increases by a number of 15685 bee families in South Region - Muntenia. 10.027 bee families in North-East Region and in the West Region 5.957 bee families. At a national level the significant increase has been in 2020 compared to 2010 of 47.4% decreasing up to 32.3% compared to 2015 and 0.2% compared to 2019.

The main trait of the Romanian market is the fact that the largest part of production lies with small private producers. some of them being under the protecting umbrella of some processors or trade associations or having supplying contracts with them. Currently, in our country the production of extracted honey during the analyzed period had an ascending trend with an annual rate of 3.3% (table 2) so that in 2020 the production of extracted honey increased by 8492 tons compared to 2010.

The largest honey production belongs to South-West Region Oltenia supplying between 2010-2020 an average of 4327 tons and a maximum of 5299 tons in 2017.

In the North-West Region a production maximum is registered in 2020 respectively 4345 tons and a minimum of 2771 tons in 2010 representing 38.2% with an annual rate of 3.3%. The Central Region between 2010-2020 maintains a linear trend supplying in average 3472 tons with an annual rate of 3.0%. In the North-East Region it's registered an increase in 2015 of 4081 thousand tons respectively 4.8% and a maximum of 4342 thousand tons in 2020 with an annual rate of 1.1% throughout the analyzed period.

South-East Region places first in 2020 registering a production of 5662 tons with a difference compared to 2010 of 3002 tons and an annual rate of 7.9%.

South Region-Muntenia registers increases between 2013-2017 with an average of 3613 tons only to decrease in the following period (2019-2020). registering an average of 3520 tons and a negative annual rate of 0.1%.

Placing last is the Bucharest-Ilfov Region with a period average of 266 tons and an annual rate of 3.8% having a small increase towards the end of the analyzed period.

Table 2. Analysis of honey production extracted in Romania, by Development Regions between 2010-2020 (tons)

| Development Region | 2010 | 2011 | 2013 | 2015 | 2017 | 2019 | 2020 | Average | Deviation (%) | Var C* (%) | Annual rate (%) |
|--------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|---------------|-------------|-----------------|
| TOTAL | 22222 | 24127 | 26678 | 27893 | 30177 | 25269 | 30714 | 25322.4 | 4024.8 | 15.9 | 3.3 |
| NORTH-WEST | 2771 | 3159 | 3117 | 3568 | 4031 | 3263 | 4345 | 3320.5 | 657.9 | 19.8 | 4.6 |
| CENTRAL | 2891 | 3466 | 3958 | 4269 | 3829 | 3408 | 3877 | 3472.3 | 502.7 | 14.5 | 3.0 |
| NORTH-EAST | 3894 | 3692 | 3433 | 4081 | 3917 | 3691 | 4342 | 3654.3 | 455.3 | 12.5 | 1.1 |
| SOUTH-EAST | 2650 | 2728 | 3130 | 3271 | 5201 | 4333 | 5652 | 3553.5 | 1212.7 | 34.1 | 7.9 |
| SOUTH -MUNTENIA | 3592 | 3318 | 4152 | 4058 | 4049 | 3078 | 3546 | 3541.3 | 476.7 | 13.5 | -0.1 |
| BUCHAREST – ILFOV | 225 | 215 | 379 | 277 | 261 | 314 | 328 | 266.0 | 67.8 | 25.5 | 3.8 |
| SOUTH-WEST OLTENIA | 3409 | 4037 | 4491 | 4657 | 5299 | 4712 | 5278 | 4326.7 | 855.7 | 19.8 | 4.5 |
| WEST | 2790 | 3512 | 4018 | 3712 | 3590 | 2470 | 3346 | 3187.9 | 491.0 | 15.4 | 1.8 |

Source: own calculations based on INSSE data. *Variation coefficient: <10 = small; 10-20 = average; >20 = large.

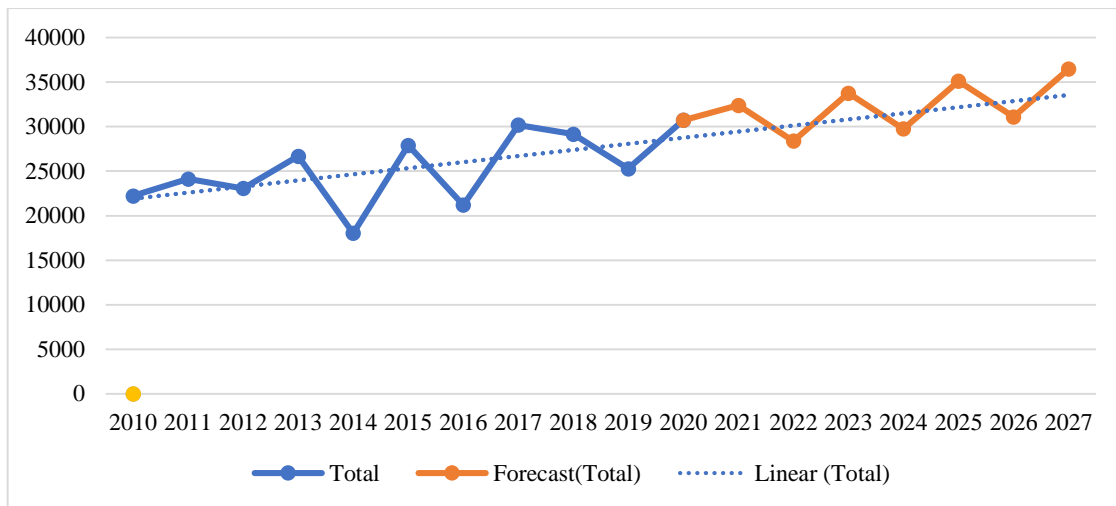


Figure 2. Tendency of honey production in Romania

Source: authors calculations

According to estimations it's expected for honey production to increase by 2027 if this trend that has been analyzed between 2010-2020 is maintained.

Regarding honey consumption. Romania is among the countries with the lowest consumption in Europe although an increase was registered in the last years.

Table 3. Analysis of the monthly average consumption of honey per person, per social categories and per residence (Kg), between 2010-2020

| Specification | UM | 2010 | 2011 | 2013 | 2015 | 2017 | 2019 | 2020 | Average | Deviation | Var. C.* | Annual Rate |
|--|-------|-------|-------|-------|-------|-------|-------|-------|---------|-----------|----------|-------------|
| Total | Total | 0.057 | 0.058 | 0.061 | 0.072 | 0.083 | 0.092 | 0.092 | 0.073 | 0.014 | 19.1 | 4.9 |
| | Urban | 0.72 | 0.073 | 0.073 | 0.087 | 0.1 | 0.108 | 0.104 | 0.146 | 0.191 | 130.9 | -17.6 |
| | Rural | 0.039 | 0.039 | 0.046 | 0.055 | 0.063 | 0.073 | 0.078 | 0.056 | 0.014 | 25.0 | 7.2 |
| Employees | Total | 0.067 | 0.07 | 0.071 | 0.08 | 0.091 | 0.099 | 0.099 | 0.082 | 0.012 | 15.0 | 4.0 |
| | Urban | 0.074 | 0.078 | 0.079 | 0.087 | 0.101 | 0.11 | 0.105 | 0.090 | 0.013 | 14.4 | 3.6 |
| | Rural | 0.046 | 0.045 | 0.05 | 0.064 | 0.07 | 0.078 | 0.087 | 0.063 | 0.014 | 22.7 | 6.6 |
| Self-employed in nonagricultural activities | Total | 0.047 | 0.046 | 0.043 | 0.059 | 0.068 | 0.072 | 0.074 | 0.057 | 0.012 | 20.7 | 4.6 |
| | Urban | 0.063 | 0.067 | 0.052 | 0.081 | 0.092 | 0.089 | 0.077 | 0.070 | 0.014 | 19.6 | 2.0 |
| | Rural | 0.035 | 0.031 | 0.035 | 0.045 | 0.053 | 0.063 | 0.072 | 0.047 | 0.015 | 31.5 | 7.5 |
| Farmers | Total | 0.024 | 0.023 | 0.035 | 0.038 | 0.05 | 0.046 | 0.05 | 0.038 | 0.010 | 26.8 | 7.6 |
| | Urban | 0.04 | 0.023 | 0.047 | 0.083 | 0.077 | 0.039 | 0.04 | 0.047 | 0.023 | 47.9 | 0.0 |
| | Rural | 0.023 | 0.023 | 0.034 | 0.034 | 0.048 | 0.047 | 0.05 | 0.037 | 0.010 | 26.8 | 8.1 |
| Unemployed people | Total | 0.04 | 0.034 | 0.035 | 0.053 | 0.047 | 0.065 | 0.066 | 0.045 | 0.012 | 25.6 | 5.1 |
| | Urban | 0.049 | 0.037 | 0.037 | 0.059 | 0.055 | 0.075 | 0.074 | 0.053 | 0.013 | 24.4 | 4.2 |
| | Rural | 0.022 | 0.028 | 0.032 | 0.046 | 0.037 | 0.055 | 0.054 | 0.034 | 0.013 | 37.7 | 9.4 |
| Retired people | Total | 0.06 | 0.06 | 0.063 | 0.077 | 0.086 | 0.098 | 0.097 | 0.077 | 0.015 | 19.7 | 4.9 |
| | Urban | 0.076 | 0.074 | 0.075 | 0.093 | 0.104 | 0.114 | 0.11 | 0.091 | 0.016 | 17.4 | 3.8 |
| | Rural | 0.046 | 0.047 | 0.052 | 0.062 | 0.068 | 0.082 | 0.083 | 0.063 | 0.014 | 22.1 | 6.1 |

Source: own calculations based on INSSE data. *Variation coefficient: <10 = small; 10-20 = average; >20 = large.

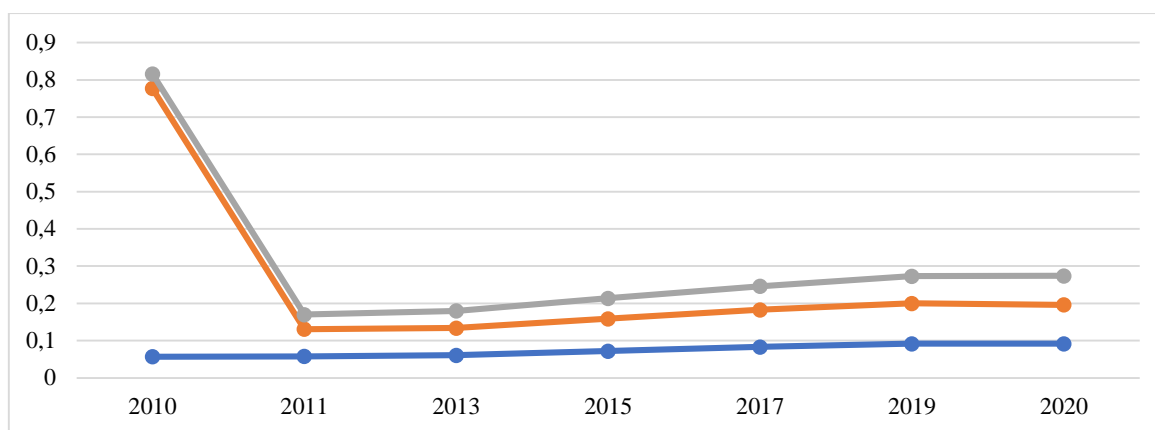


Figure.3. Evolution of honey consumption in Romania. 2010-2020

Source: authors calculations

Regarding the monthly average consumption of honey per person, per social categories and per residence we can notice that it has an ascending trend in the analyzed period. so that in 2020 it was of 0.092 kg/person representing an increase of 61% compared to 2010 but compared to previous year it maintained the same value. (table nr.3). The social category that consumes the largest quantity is employees of urban residence with an annual average of 0.090 kg/person compared to the ones of rural residence that have an average consumption of 0.063 kg/person. For the self-employed in nonagricultural activities. we can observe an oscillating trend of honey consumption. the average being of 0.057 kg/person. A maximum for the studied period is registered in 2020 with 0.074 kg/person and a minimum in 2013 of 0.043 kg/person. Regarding this category we can say that the biggest consumers remain the ones of urban residence with a difference of 0.005 kg/person compared to the ones of rural residence. The retired people category is the largest consumer of honey. followed by the categories of unemployed and farmers. The retired people are the ones that consume in average 0.077 kg/person. unemployed people 0.045 kg/person and farmers 0.038 kg/person.

According to statistic data. in the analyzed period the price for honey had important increases. accelerated even. registering throughout the analyzed period an annual rate of 6.7%. At the level of 2020 it registers the highest value of 16.86 lei/kg, respectively by 192% compared to 2010.

Also. we can see in the table below that at a regional level in 2020. the North-East Region registers the highest value. respectively 21.7 lei/kg with an annual rate of 9.7%. followed by the Central Region with 18.28 lei/kg. the South Region-Muntenia with a value of 16.97 lei/kg. the last place being held by the South-West Region Oltenia with 12.3 lei/kg.

Table nr. 4. Analysis of the average purchasing prices for honey. per country total and per Regions of Development between 2010-2020 (lei/kg)

| Products | Development Regions | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Average | Deviation (%) | Var. C.* (%) | Annual Rate (%) |
|----------|---------------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|---------------|--------------|-----------------|
| Honey | TOTAL | 8.79 | 9.99 | 10.04 | 11.46 | 13.83 | 14.62 | 15.11 | 16.13 | 16.68 | 16.66 | 16.86 | 13.7 | 3.0 | 22.3 | 6.7 |
| | NORTH-EAST | 8.59 | 9.32 | 9.15 | 11.5 | 14.5 | 13.39 | 14.33 | 17.07 | 20.68 | 20.52 | 21.7 | 14.6 | 4.8 | 33.1 | 9.7 |
| | SOUTH-EAST | 8.51 | 9.14 | 9.07 | 10.68 | 13.32 | 19.61 | 14.17 | 13.23 | 13.74 | 14.57 | 15.82 | 12.9 | 3.3 | 25.9 | 6.4 |
| | SOUTH - MUNTENIA | 8.82 | 9.48 | 8.18 | 10.81 | 11.81 | 11.51 | 12.49 | 15.63 | 21.28 | 20.05 | 16.97 | 13.4 | 4.5 | 33.6 | 6.8 |

| Products | Development Regions | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Average | Deviation (%) | Var. C.* (%) | Annual Rate (%) |
|----------|---------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|---------------|--------------|-----------------|
| | SOUTH-WEST OLTENIA | 8.59 | 9.37 | 9.5 | 11.04 | 13.49 | 12.9 | 14.92 | 15.56 | 12.2 | 11.16 | 12.3 | 11.9 | 2.3 | 18.9 | 3.7 |
| | WEST | 8.45 | 10.41 | 10.64 | 11.69 | 14.58 | 18.8 | 17.42 | 16.54 | 15.52 | 14.93 | 14.33 | 13.9 | 3.2 | 23.3 | 5.4 |
| | NORTH-WEST | - | - | - | - | - | - | 20.33 | 16.8 | 15.66 | - | - | 17.6 | 2.4 | 13.8 | - |
| | CENTRAL | 9.2 | 10.72 | 11.31 | 12.25 | 14.48 | 15.24 | 14.92 | 17.59 | 17.57 | 17.88 | 18.28 | 14.5 | 3.2 | 22.1 | 7.1 |

Source: processed INSSE data

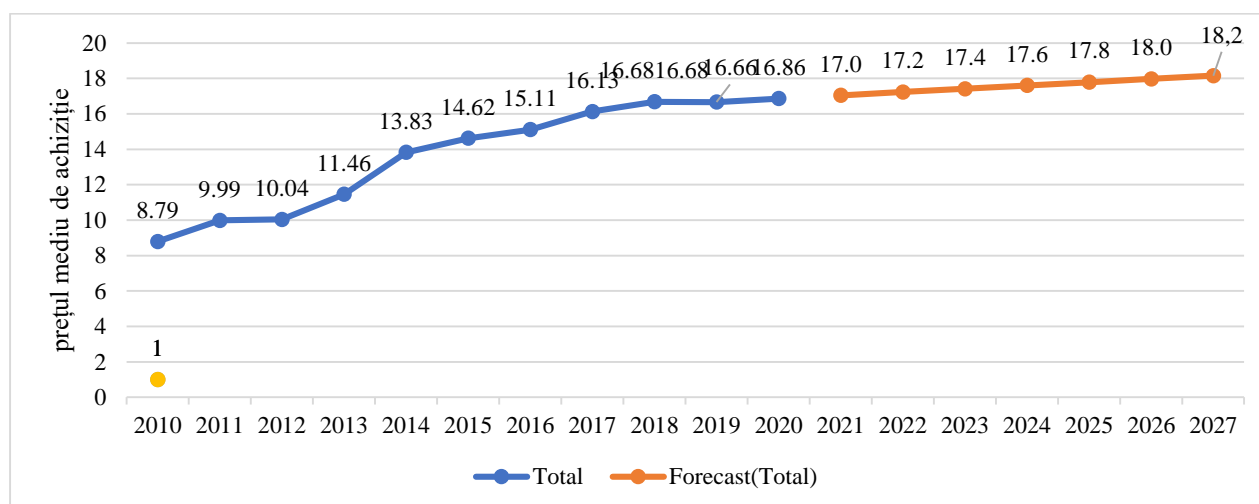


Chart nr. 4. Tendency of the average purchasing price for honey

Source: authors calculations

We can see, according to estimations that the tendency for the average purchasing price is a relatively constant one. that will reach in 2027 the value of 18.2 lei/kg.

CONCLUSIONS

The prices of the apiculture products are influenced in a higher or smaller proportion depending on the characteristics of the chosen distribution channels (length, width and depth).

Although Romania places 4th regarding honey production in Europe. Romanian beekeepers being recognized for the quality of produced honey. the price obtained by beekeepers is extremely low. Currently, the EU supports the apiculture sector, including the one from Romania, within common agricultural policy (CAP), mainly through national apiculture programs. These programs contain eight measures concentrated clearly on the improvement of general conditions of production and marketing of apiculture products, such as technical assistance for beekeepers, monitoring the market and combating beehive invaders and diseases.

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