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ANALYSIS OF THE TRENDS IN THE PRODUCTION STRUCTURES OF PROTEIN CROPS

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Abstract

Protein crops are an important part of ensuring the food and feed balance. They are the main contributors for having a favorable environmental impact on agricultural land, climate, and water, which is ensuring the importance of their further study.

The main objective of this article is to highlight the structural changes and the existing problems in the "protein crops" production, based on the analysis of the current situation in the sector.

The research methods used for this study are: systematic and comparative analysis; expert method; descriptive analysis; inductive and deductive analysis and summaries and recommendations.

The CAP impact on the protein crops production has been outlined. An analysis of the total size by the groups of protein crops is performed. The value indicator, the final output of protein crops has been analyzed as well as their contribution for the formation of the final output of the crop growing.

Key words: protein crops, coupled support, agricultural holdings

INTRODUCTION

Protein crops play a big part in ensuring the food and fodder balance while at the same time they have a favorable ecologic impact on the preservation of agricultural land, climate and sustainable water use practices. All this determines their significance for the production structure in agriculture. The growing demand for foods rich in plant proteins is a global trend, which is no exception at European level, where even more people are environmentally conscious and strive for more sustainable eating habits. Within the EU, the prospects for growing protein crops are particularly good and the deficit of vegetable protein is high (in the range between 70-80% in the last 40 years) (Report of the Commission to the Council of the European Parliament, 2018). This makes the necessity of doing research on the state, trends and problems in the cultivation of protein crops in the country apparent. It is imperative to take adequate measures to promote protein crops production so that it can meet the growing demand in the global, European and national markets. For this study we are researching the production structures in Bulgaria, where protein crops have long been part of the eating habits. The impact of CAP policy will be one of the focuses with main objective the change of the production structures in the country.

In the article we present some of the results achieved under the National scientific program "Healthy foods for strong bioeconomy and quality of life", funded by the Ministry of Education and Science.

METHODOLOGICAL APPROACH

The main objective of the article is to highlight the structural changes and the existing problems in "protein crops", based on the analysis of the current situation in the sector.

Research object – protein crops, including beans, lentils, chickpeas, peas, peanuts, soybeans, broad beans; alfalfa, sainfoin, vetch, clover, cowpea, burchak, lupine and star anise.

Subject of research - the production structure in the sector in Bulgaria.

The research will be oriented mainly to outline the impact of the new Coupled Support Scheme for protein crops under the direct payments, implemented in the country since 2015.

Research methods – to achieve the set goal, a number of methods will be used and a set of indicators will be studied that characterize the state and the ongoing structural changes in the sector. The wide range of modern research methods will allow the analysis and assessment of the condition, determination of factor dependences and trends in the development of protein crop production: systematic and comparative analysis; indicator method; expert method; descriptive analysis; inductive and deductive methods for analysis and formation of summaries and recommendations.

Information sources – The research is based on official statistical information (National Statistical Institute; Ministry of Agriculture, Food and Forestry, Department "Agrostatistics").

Research period – it covers the period 2007-2020, which includes the programming periods of the CAP (2007-2013) and (2014-2020), outlining the trends separately for the two periods, as well as the general trends for the whole analyzed period. The date for both periods is from on source and allows comparison between the two periods and long-term trends. Where long-term trends are not necessary or the information is insufficient, shorter statistical lines will be used.

System of indicators - The analysis covers several relevant indicators, outlining the structural changes in the protein crop sector, which we have systemized in groups (Anastassova - Chopeva M., 2019; Koteva, N., 2020):

A/ Indicators characterizing the support level under the Coupled Support Scheme for protein crops

- Annual single area payment (BGN/ha);
- Number of supported farms under the Scheme;
- Relative number of supported farms from all holdings growing protein crops;

B/ Indicators characterizing structural changes in the sector

The analysis will cover indicators for achieving production results on a sectoral level.

1. Production results on a sectoral level includes the following indicators:

- Amount of sown areas in total and by crops groups, ha;
- Relative share of areas with protein crops from the total arable land, %
- Change in the structure of areas with protein crops;

2. Value indicators

- Final output from protein crops, million BGN;
- Relative share of the final output of protein crops from the total crop growing output;

The detailed analysis based on the proposed system of indicators will allow a clearer assessment of the CAP impact in the sector for making reasonable proposals for a more adapted policy for Bulgarian agriculture.

Support for agricultural producers of protein crops

In the framwork of the CAP (2014-2020) the following toolkit has been proposed for the support of farmers growing protein crops:

- greening - through the possibility of growing certain crops enriching the soil with nitrogen, which are beneficial for the biological diversity in the ecologically oriented areas, and through the requirement for crops diversification. The nitrogen-enriching crops are the most commonly declared type of ecologically oriented areas.
- voluntary coupled support that can be provided to sectors experiencing certain difficulties and to maintain the current production level.

During the programming period, a new Coupled Support Scheme for protein crops for direct payments was introduced, which consists of additional support for the areas occupied by protein crops. The crops from this group that have provided financial support are determined on the basis of their protein content (over 20%), which guarantees their high biological and nutritional value. Applicants for the Coupled Support Scheme for protein crops may, with the areas occupied by the crops under the scheme, simultaneously fulfill the requirement for the presence of ecologically oriented areas, in case the requirements are applicable to their farm, in order to receive a green payment. The problem is that the nitrogen-fixing crops, which are part of the declared ecologically oriented areas, should not be treated with plant protection products, according to a requirement enforced by a European regulation from the summer of 2017.

In Bulgaria, the subsidy through the Coupled Support Scheme for Protein Crops started in 2015. In determining the list of crops eligible for the support, the national specifics of Bulgaria and the suitability of natural conditions for their cultivation were taken into account. The final list presented was the following: beans, lentils, chickpeas, peas - fodder grain, peanuts, soybeans, broad beans, alfalfa, sainfoin, vetch, clover, cowpea, burchak, lupine, star anise. Producers on the territory of the whole country growing at least 0.5 hectares of eligible areas, have the right to be supported under the above – mentioned Scheme. The areas must be eligible for SAPS support and the minimum plot size must be 0.1 ha. The rate for support of areas under protein crops shall be determined each year by dividing the fixed budget under the scheme by the areas eligible for support for protein crops for the given year. The amounts of the annual rate under the Scheme for Protein Crops are the following: respectively the 2015 harvest - 285.14 BGN / ha; for 2016 - 216.60 BGN/ ha; for 2017 - 157.53 BGN/ ha; for 2018 - 135.64 BGN/ ha; for 2019 - 214.77 BGN/ ha and for 2020 - 259.22 BGN/ ha (State Fund Agriculture and Ministry of Agriculture, Food and Forestry). With decreasing rates per unit of area, for the analyzed period there is a trend to increase the number of supported agricultural holdings. While for 2015, nearly 11 thousand agricultural holdings were supported, which represent 18.5% of the holdings growing protein crops, the number of beneficiaries in 2016 increased to 15072, increasing the share of supported farms to 25.4%. In 2018, the beneficiaries under the Scheme for Protein Crops continue to grow and reach 17,860 (according to State Fund Agriculture and Ministry of Agriculture, Food and Forestry, "Agrostatistics").

RESULTS OF THE ANALYSIS

Within the dynamics of protein crops areas there are two clearly defined periods of change. The period 2007-2014 is characterized by a decrease of areas with cereals and bean crops, as a result of which the total areas with protein crops have also diminished. The decreasing trend is more expressed after 2009. In 2014 the lowest levels for the analyzed period have been reached, respectively the areas with peas, beans, brood beans, lentils and other legumes are 4877 ha with a significant decrease of 28%, meadows with legumes - 86619 ha with a decrease of 7%, as a result of which the total area decreases to 91496 ha.

The period 2015-2018 is characterized by a significant increase of protein crops areas, which reached their highest value in 2018, respectively 216147 ha. In the next year there is a registered decrease in farms, but the number of areas remains higher than the previous period. While the size of meadows with legumes increased, the total protein crops areas have decreased in 2019 and 2020 compared to 2018, due to the diminution of areas occupied with crops for human feeding.

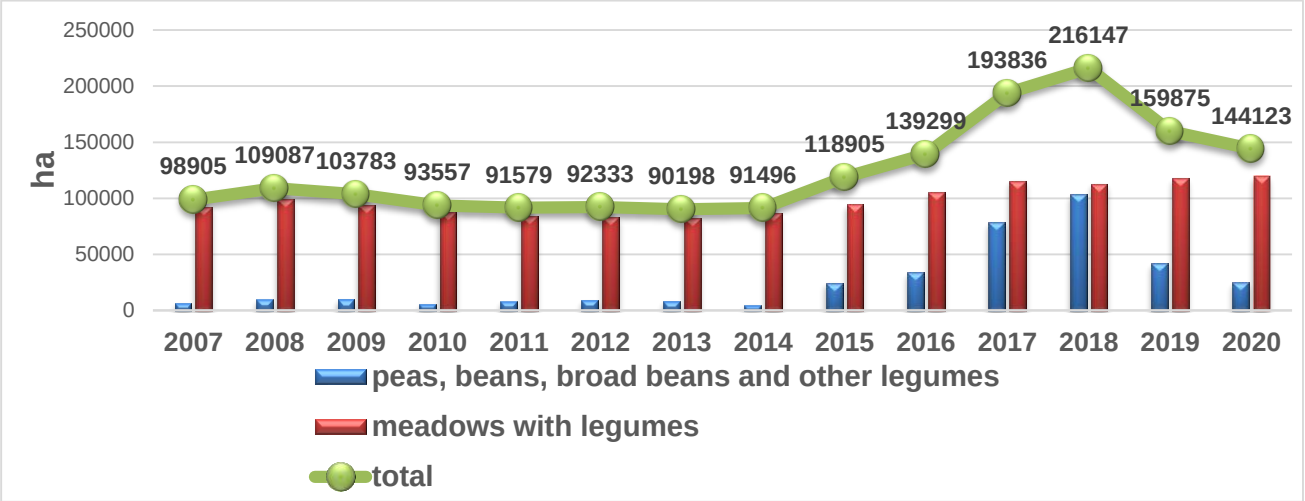

Fig.1. Areas with protein crops
Source: MAFF, "Agro-statistics", BANSIK

The analysis of data indicates categorically that the support under the Coupled Support Scheme for Protein Crops has a serious impact on the intentions of agricultural producers to increase the protein crops areas. Data show that subsidizing has had extremely strong impact for the increase of areas with legumes in the period 2014-2018. This was helped by the market situation, which provided between BGN 500 and 2000 net income per ha (excluding annuity costs and subsidies received) (https://agronovinite.com, 30.04.2018). With the application of the Scheme for Protein Crops from the first year – 2015, the areas with these crops have increased 5 times, compared to 2014, while the areas with fodder crops have increased by only 30%.

An additional incentive is the introduction of the so-called "Green payments" in 2014, giving farmers the opportunity to meet the requirements for obtaining them by sowing protein crops. Protein crops, unlike other options for implementing green payments, provide them with an additional subsidy, initially from 280 BGN/ ha, which subsequently dropped to about 200 BGN/ ha.

After 2018 the decrease of areas with peas, beans, broad beans, chickpeas and other legumes indicated that apart from the support under the Scheme for Protein Crops, there were also other factors influencing the attitude of farmers. The main problems with the realization of the production of imported seeds are because they are not always suitable for our conditions. Featured as a narrow niche (at least than other cereals) and with relatively low production costs, legumes often suffer from sharp price fluctuations. Any market signal that for a given crop the production is lagging behind consumption gives an incentive to producers to increase the area very quickly, which inevitably leads to price adjustments towards a decrease. In the previous programming period (2007-2013), due to the lack of interest, the seed production of protein crops in Bulgaria was very limited. The orientation towards protein crops and the increased demand for seeds, with regard to the insufficient and poorly organized seed production in the country, forced farmers to focus on imports of seeds, which is not always suitable for the natural factors and the climatic conditions of the country - the reason for the lower yields. The requirements of the legume production are relatively high, and due to a lack of sufficient experience on part of the farmers lower yields and higher yield fluctuations are obtained. The failure to achieve the expected yields also leads to fluctuations in the attitudes of farmers in the cultivation of cereals and legumes.

The dynamics of the total arable land and the areas with protein crops form their different share by years for the analyzed period. The period 2007-2014 is characterized by a clearly defined negative trend of decreasing the relative share of nitrogen-fixing crops in the structure of arable land, reaching the lowest value - 2.6%. In the next period, with an outpacing growth rate of areas with protein crops in relation to the growth rate of the total arable land, there is a trend to increase their share, which in 2018 reached the highest level - 6.2%. Despite the fluctuations, the trend is towards an increase in the relative share of protein crops from the arable land in the country.

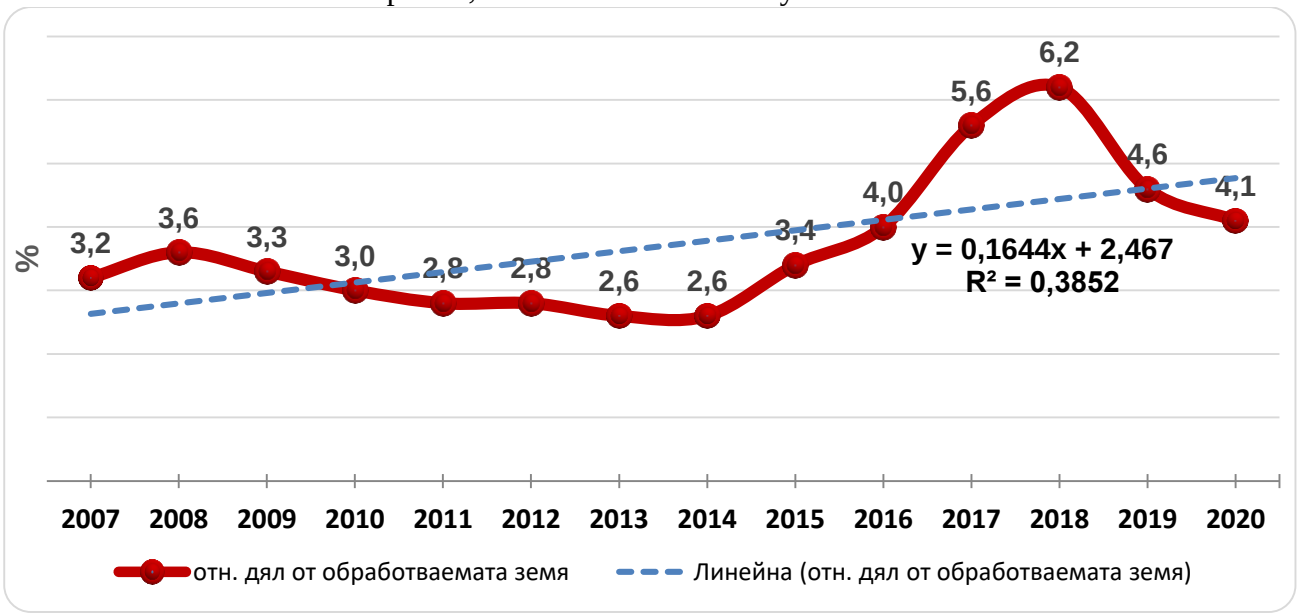

Fig. 2. Relative share of protein crops areas from the total arable land
Source: MAFF, "Agro-statistics", BANSIK and own calculations

The changes in the structure of protein crops areas are of great interest. In the overall period predominant were the structures of temporary meadows with legumes, but since 2015 their relative share has decreased in comparison to the protein crops share, destined to human feeding, as in 2018 their shares were almost equal. As early as the following 2019, with the decline of the areas with cereals and legumes, the dominant share of meadows with fodder protein crops has been restored.

The dynamics in the areas, the output and the prices form the value of the final production of protein crops. The period 2007-2014 is characterized by serious fluctuations - declines and increases in the level of final production. For this period, the highest value was achieved in 2009 - BGN 38.6 million, followed by a significant decrease to BGN 8.0 million. After 2015 with a significant increase in areas, under the impact of the Coupled Support Scheme for Protein Crops, the value of the final production also increased and the peak was reached in 2017 - BGN 145.4 million. The dynamics of the final output values forms the share of protein crops in the total value of crop growing. The trend of the relative share of the final output of protein crops follows the change of its value. For the entire analyzed period, the highest relative share was achieved in 2017 - 2.61%.

The relative analysis shows the highest share of protein crops areas in arable lands in relation to their share from the final output in the crop growing, which is due to the lower created added value.

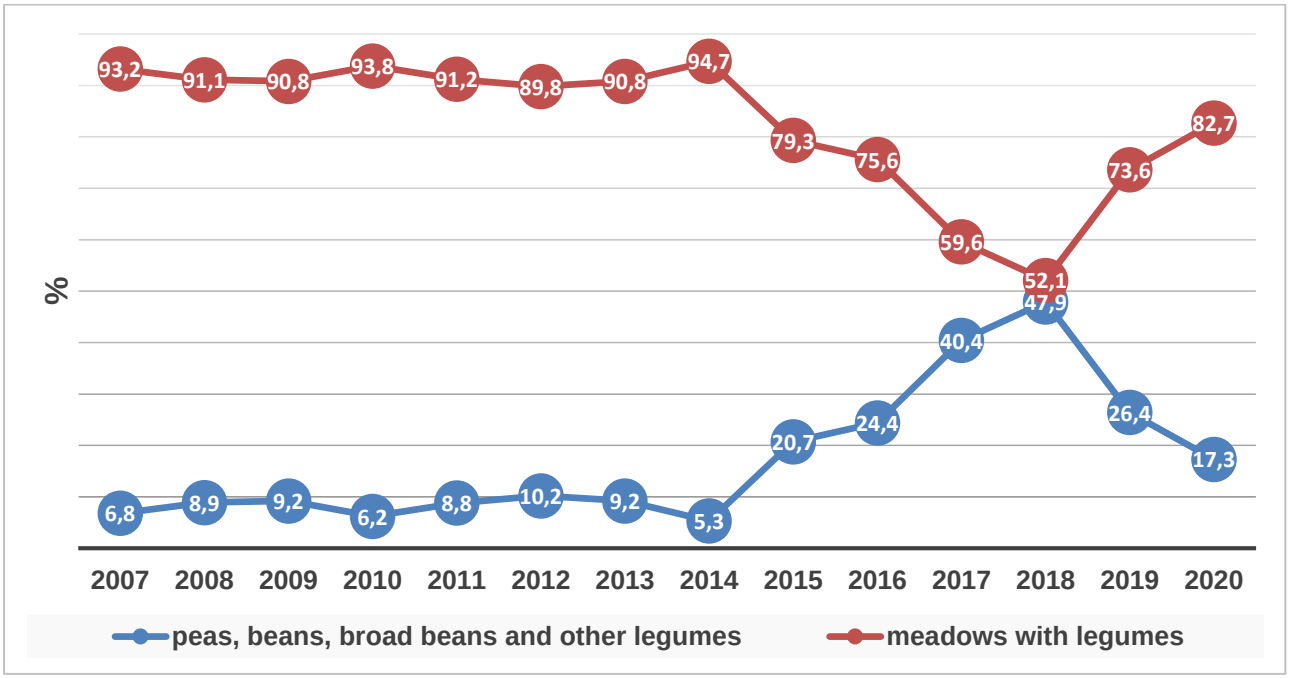

Fig.3. Dynamics in the protein crops area structure
Source: MAFF, "Agro-statistics", BANSIK and own calculations

Table 1. Final output according the basic prices (million BGN)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Protein crops, million BGN	12,7	11,0	38,6	21,6	21,8	8,0	8,8	9,0	48,7	70,5	145,4	122,7	33,6
Crop growing, million BGN	3062,5	4868,9	3944,4	4211,4	4971,6	5227,7	5244,7	5385,5	5135,6	5225,3	5567,1	5773,0	5639,1
Relative share, %	0,41	0,23	0,98	0,51	0,44	0,15	0,17	0,17	0,95	1,35	2,61	2,13	0,6

Source: National Statistical Institute and own calculations

CONCLUSION

Based on the analysis, the following conclusions can be made:

- The Coupled Support Scheme for protein crops in direct payments, implemented during the current programming period, has a positive impact on the sector development;

- With the 2017 ban on the use of pesticides in ecologically targeted areas farmers prefer to declare as ecologically targeted mainly the fallow land, not the nitrogen-fixing crops, as the ban on spraying will limit their yields. Farmers fear potential economic losses from growing legumes due to the inability to maintain adequate plant protection. This limits long-term incentives for farmers to diversify their production;

- Lack of quality seeds suitable for natural and climatic conditions on the site;

- Problems with the realization of the output are emerging;

- Maintaining a low relative share of protein crops in the final crop production.

In conclusion, the sustainable increase of areas with legumes nessesitates not only sufficient conditions, but also targeted policy for the sector. The study shows that in order to increase the competitiveness of protein crops, it is necessary to strengthen selection resources,

organize seed production, expand consulting services, overcome the lack of knowledge and have a better acquaintance with the specific agricultural practices of farmers in growing different types of protein crops; cooperation between farmers and other actors in the chain; association of farmers to strengthen their market positions.

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