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Production of part of the organic crops, compared to the traditional production in the country

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Abstract: The natural endowment is vitally important for the development of various types of agricultural crops affecting society. The imposition of "new agricultural crops" is associated with the development of science and the need for such for the future. In this regard, bio-cultures are an alternative to conventional production. In the future, bio-culturities will take their place in the country's economy. Their capabilities as raw materials will be transformed according to the needs and consumption, both for the processing industry and for society. His is the "connection" between the two types of cultures – the traditional ones, without which society cannot exist at this stage, and on the other hand, the bio-cultures, which claim their place in the future. Analysis and conclusions are based on the period 2012 – 2021. In the development of the scientific publication, the following statistical, mathematical and comparative methods (for a certain period of time) were used, which aim to reveal the relationship between organic and conventional crops.

Keywords: Bulgaria; comparative analysis; conventional crops; bio-cultures

Производство на част от биокултурите, спрямо традиционното производство в страната

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Резюме: Природната даденост е жизненоважна за развитието на различни типове селскостопански култури, засягащи социума. Налагането на „нови селскостопански култури" се свързва с развитието на науката и нуждата от такива за бъдещето. В тази връзка биокултурите се явяват алтернатива на конвенционалното производство. В бъдеще биокултурите ще заемат своето място в икономиката на страната. Техните възможности като суровини ще се трансформират според нуждите и потреблението, както за преработващата индустрия, така и за социума. Това е „връзката" между двата вида култури – традиционните (без които на този етап социумът няма как да съществува) и от друга страна, биокултурите, които претендират за своето място в бъдещето. Анализът и изводите се базират на периода 2012 – 2021 година. При разработването на научната публикация са използвани: статистически, математически и сравнителен метод (за определен период от време), които имат за цел да разкрият връзката между биологичните и конвенционалните култури.

Ключови думи: България; сравнителен анализ; конвенционални култури; биокултури

INTRODUCTION

Bio-economy is part of the modern scientific disciplines that emerged as a result of the unification of science with practice, serving society. The creation of models by the bio-economy provides solutions to issues related to the processing and application of technologies serving the agricultural and food industry sectors. Attempts are being made to protect the environment on the one hand and to increase and impose new varieties that meet modern needs. Bioeconomy as a discipline tries to support a number of sectors of the economy on a global scale, where resources are limited or incorrectly distributed across continents (Borisov et al., 2020). Bio economy is the "element" in modern management that offers a solution to some of society's problems. Therefore, the bio economy has the ability to withstand anthropogenic impact (ecological sustainability) and minimize adverse effects on the natural environment. Organic farming is a total system of agricultural management and production including the totality of food, in which the best practices in terms of environmental protection are combined. An important element is to maintain a high degree of biological diversity, to protect natural resources – all species, to apply high standards of humane treatment of animals, their breeding and use. The production methodology, to comply with the preferences of some consumers for products produced using natural substances and processes (Markov and Toneva, 2018).

METHODOLOGY

The research in the publication is based on the definition and accepted definitions of bio-economy. The various environmental factors that have a subjective or objective impact on the bio-economy and the processes related to it are examined. The paper examines conventional crops as well as those related to organic farming. An attempt is made to apply a statistical-mathematical method (model) for the analysis of agricultural lands in the country for a period of eight years. Based on the obtained numerical values, the comparative analysis of agricultural crops is applied through the presented mathematical model. Table 1 visualizes the ratio between organic crops and conventional crops for a period of four years.

Where:

$Y = W + Z \leftrightarrow Z / (W + Z) * 100$

W – Area with conventional crops in (thousands ha)

Z – Area with organically grown crops (ha)

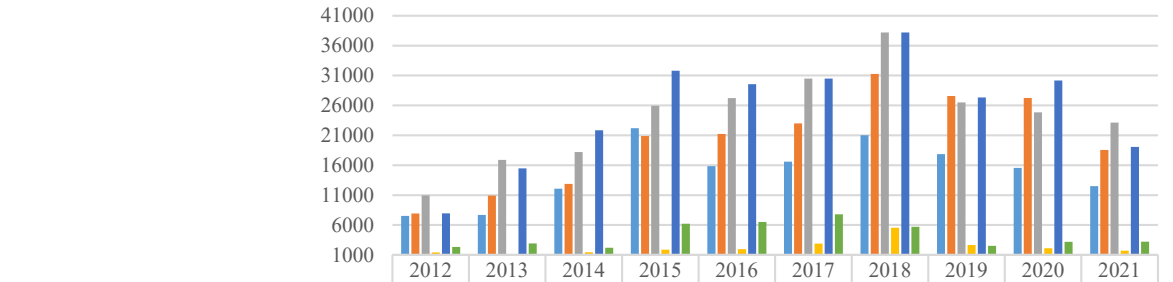
Y – Total area with agricultural crops in (thousands ha)

The statistical information for the publication was taken from "Agrostatistics – Plant Breeding" – Ministry of Agriculture, Food and Forestry, for the period 2012 – 2021.

RESULTS AND DISCUSSION

The organic farming scheme started in the EEC/EU in 1987. The 1992 EU reform of the CAP presented the first basis for supporting farmers to switch to or maintain organic production with Community funding (Bachev, 2016). In 2016, the areas in Bulgaria covered by the organic production control system were 162,352 ha, or more than 6 times more than in 2010, 25,588 ha. In just one year compared to 2015, the 118,571 ha of areas cultivated using organic production methods increased by 43,781 ha or by 137%. In the EU countries as of 2016, 12 million hectares of areas with organic production are cultivated, and the increase is in all countries. According to the latest information as of 2016, 6.7% of all arable land is used for organic production. Between 2010 and 2016, the increase was over 30%, with an annual growth rate of 4.4%.

Within a nine-year period, the areas of cereals and rice grew by 39.72%. The largest growth in the planting of the indicated crops in ha from the initial period to 2015, the increase was 66%, and in the following years it gradually decreased until the end of the study year. In 2018, as visualized in fig. 1 growth of the sown areas compared to the initial period also has an increase of 64%, there



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Cereals, including rice	7532	7669	12061	22191	15847	16602	21019	17845	15550	12497
Technical cultures	7909	10924	12878	20873	21236	22998	31273	27578	27253	18544
Perennials	10959	16885	18213	25946	27221	30485	38188	26502	24829	23124
Fresh vegetables, melons and strawberries	1421	1037	1445	1866	1954	2894	5527	2648	2108	1716
Permanent meadows and pastures	7957	15476	21831	31796	29548	30485	38188	27339	30154	19063
Fallow	2315	2905	2205	6209	6501	7782	5707	2510	3192	3217

Fig. 1. Organically grown areas (ha) in Bulgaria
Source: "Agro statistics – Crop production" – MAFF.

is a decrease of two percent from the maximum of sown ha in 2015.

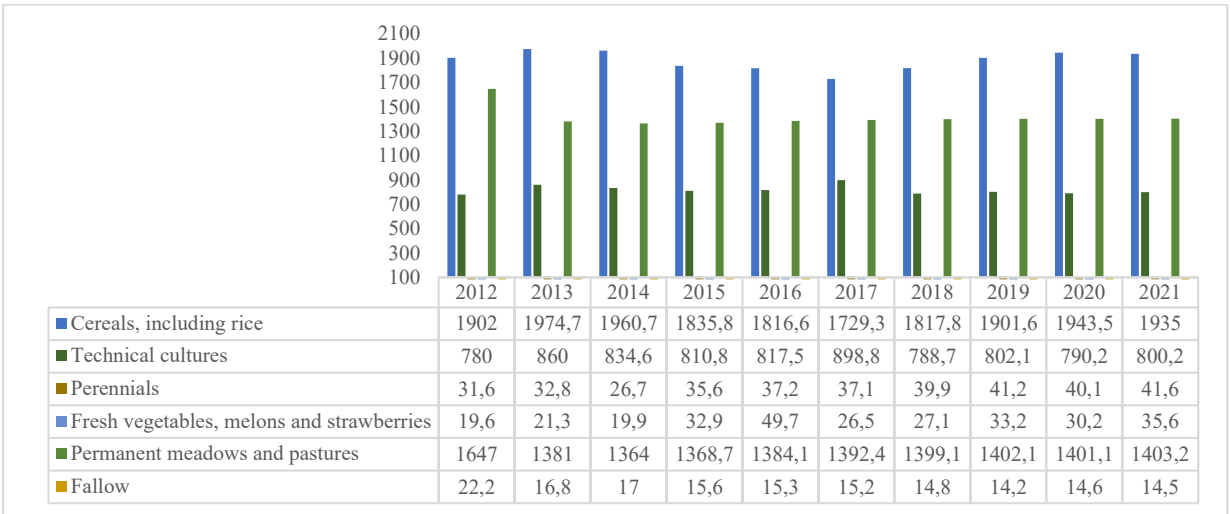
For technical crops, an increase in the sown areas in hectares for the country is reported during the study period 2012 – 2021. From the first year of the study to the final one, the numerical values report a growth of 57%. During the indicated period, the occupied areas have different dimensions and move in different ranges according to subsidies, market needs, demand for production on European and world exchanges. With the largest increase in areas reported in 2018, from the initial period, the growth was 74.7%, and by the end of the study in 2012, there was a decrease of 40.2%. Regardless of the decrease in the areas occupied by technical crops, they maintain the growth rate of increase from the initial year of the study.

In the case of permanent plantations, there is also a growth in the area in ha from the first year of research to the last by 52.6%. With the greatest increase in the occupied areas in ha, are in the period 2012 – 2018, with a growth of 71.3%, and for the last mentioned year there are 38,188 ha of permanent plantations. In the period 2018 – 2021, the decrease of occupied areas is 39.44%. Regardless of the decrease in the areas occupied by permanent plantations, they maintain the growth rate of increase from the initial year of the study.

For fresh vegetables, a 17% increase in the area in ha from the first year of research to the last is also reported. With the largest increase in the occupied areas in ha, are in the period 2012 – 2018, with a growth of 25.17%. Within three years from the highest peak to the end of the study, there was a 31.04% decline in planted area.

In permanent meadows and pastures for the study period there was an increase in ha by 58.25%, which is a significant increase in land used for agricultural activities. A high growth in ha of this type of land is reported in the period 2012 – 2018, by 80%. After the indicated years until the end of the study, there is a decrease in permanent meadows and pastures by 50.02%. The high amplitude values, during the research period, are related to the subsidies under various European and national programs to support agriculture.

In the case of fallow land during the research period, no drastic changes in the trend are reported, as within 2012 – 2021, the growth of the areas of this type is 28%. Here there is a peak of occupied areas in ha in 2017, with 30%. By the end of the study, the values are approaching the initial



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Cereals, including rice	1902	1974,7	1960,7	1835,8	1816,6	1729,3	1817,8	1901,6	1943,5	1935
Technical cultures	780	860	834,6	810,8	817,5	898,8	788,7	802,1	790,2	800,2
Perennials	31,6	32,8	26,7	35,6	37,2	37,1	39,9	41,2	40,1	41,6
Fresh vegetables, melons and strawberries	19,6	21,3	19,9	32,9	49,7	26,5	27,1	33,2	30,2	35,6
Permanent meadows and pastures	1647	1381	1364	1368,7	1384,1	1392,4	1399,1	1402,1	1401,1	1403,2
Fallow	22,2	16,8	17	15,6	15,3	15,2	14,8	14,2	14,6	14,5

Fig. 2. Areas of agricultural conventional crops in (thousand ha) in Bulgaria
Source: "Agro statistics – Crop production" – MAFF and authors' calculations.

data or from 2017 to 2021, the decrease is 4,565 ha with 41.71%.

For the considered period 2012 – 2021, the areas with cereals and rice grown in the traditional way vary. In the first three years, they grew from 1902 thousand ha in 2012 to 1960, 7 thousand ha in 2014, which is an increase of about 3%. From 2015 to 2017, they decreased by about 5%. From 2018, they start to grow again until 2021 by about 6%, which is due to the support of grain and rice producers under the CAP measures.

The areas occupied by technical crops for the period 2012 – 2021 grown in a traditional way increased slightly by about 3%. The largest increase was in 2017 – 898.8 thousand ha.

The areas occupied by conventionally grown perennials are increasing from 2012 to 2021 by 25%. The largest increase in areas is in 2021 – 41.6 thousand ha. During the entire considered period, the increase in the areas occupied by this type of crops is mainly due to the support under the CAP measures.

The areas occupied by fresh vegetables grown in a traditional way during the considered period increased by 48% in 2021. The largest increase in areas was in 2016 – 49.7 thousand ha.

The areas occupied by permanent meadows and pastures for the period 2012 – 2021 decrease by about 17%. The largest decrease in area was in 2014 – 1,364 thousand ha.

In the case of fallow areas during the research period 2012 – 2021, a decrease was also observed from 22.2 thousand ha in 2012 to 14.5 in 2021, i.e. the decrease is by 43%. The biggest decrease in areas was in 2019 – 14.2 thousand ha.

Table 1 shows that the percentage ratio between the areas with cereals and rice grown organically and the areas with the same crops grown in a traditional way for the period 2014 – 2021 increased from 0.62% in 2014 to 1.3% in 2021 in benefit of organic production based on the methodology mentioned above.

The percentage ratio between the areas with technical crops grown in an organic way and the areas with the same crops grown in a traditional way for the period 2014 – 2021 increased from 1.54% in 2014 to 3.91% in 2021 in favor of the biologically grown technical crops based on the methodology specified in the study.

The percentage ratio between the areas with perennial crops grown organically and the areas with the same crops grown in a traditional way

Table 1. Percentage ratio between biological to conventional crop production sown areas (ha) in the period 2014 – 2021

Types of crops	2014	2016	2018	2020	2021
Cereals, including rice	0.62	0.86	1.14	1.32	1.3
Technical cultures	1.54	2.53	3.81	3.8	3.91
Perennials	68.2	42.25	48.9	47.82	48.6
Fresh vegetables, melons and strawberries	7.26	3.78	6.71	6.52	7.2
Permanent meadows and pastures	3.01	2.09	2.66	3.1	3.02
Fallow	13.1	29.82	27.83	28.93	29.01

Source: "Agro statistics – Crop production" – MAFF.

for the period 2014 – 2021 decreases from 68.2% in 2014 to 48.6% in 2021 at the expense of organic production on the basis of the indicated above methodology.

The percentage ratio between the areas occupied by fresh vegetables grown in an organic way and the areas with fresh vegetables grown in a traditional way for 2014 and 2021 remains at the level of about 7.2% based on the methodology indicated in the study.

The percentage ratio between the permanent meadows and pastures cultivated biologically and the same cultivated in a traditional way also remained at the level of about 3.01% for 2014 and 3.02% for 2021, based on the methodology indicated in the study.

The percentage ratio between the areas with biologically managed fallow and the areas managed in a traditional way for the period 2014 – 2021 increased from 13.1% in 2014 to 29.01% in 2021 in favor of biologically managed fallow based on the methodology indicated in the study.

The ratio between conventional and organic crops in ha for the country is in favor of traditional plantations, this is related to many socio-economic factors. Fig. 3 visualizes the trend where

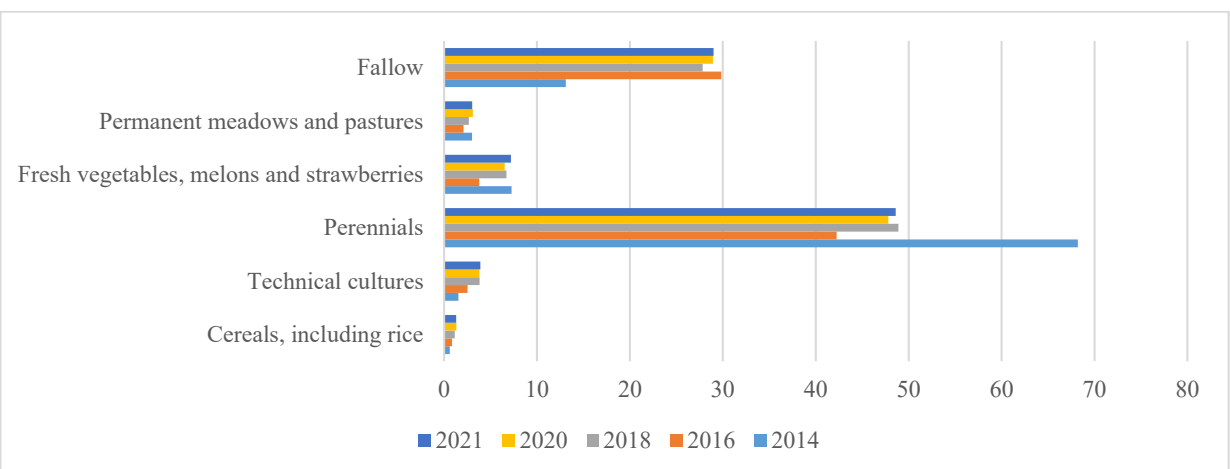


Fig. 3. Sown areas (ha) as a percentage of organic to conventional crop production for the country in the period 2014 – 2021

Source: "Agro statistics – Crop production" – MAFF.

the upward movement of areas in ha with organic crops is visible. In cereal crops from the first year of the study to 2018, there was an increase in areas by 1%. The reason for the minimal increase is the tradition of growing conventional crops and the slow change, which largely depends on a number of socio-economic factors of a local and national nature.

Technical crops during the study period increased by about 3%. In perennial crops, as can be seen in fig. 3, they have the highest growth in ha compared to other crops. Fresh vegetables, melons and strawberries, the trend is possible to apply a higher percentage of organic farming, so the areas will increase. Meadows and pastures also maintain an upward trend, an increase of about 2% was observed throughout the period.

CONCLUSION

The European Union's organic farming regulations aim to provide a clear structure for the production of organic products across the EU. The aim is to satisfy consumer demand for reliable organic products while ensuring a fair market for producers, distributors and traders (Olah et al., 2020). Bio-economy research can be applied both at national and local levels. Indicators can change depending on the research and what is embedded in the models. Investment policy for the bio-economy has a direct impact on production on the ground. The influence of scientific organizations is essential for the development of the bio-economy, the introduction of new technologies in combination with scientific capacity. (Falaleeva et al., 2016). Organic fuels are a major obstacle to the more sustainable development of humanity. The natural environment appears as a basis for the development of different types of crops, specifically for the country. The geographical location of an area also has a direct impact on the quantity and quality of future productions. Each region of the country is specific in this respect, which allows the cultivation of endemic agricultural species. The very geographical location of the country is favorable for the development of different types of organic crops (Shaban et al., 2020). The natural resource potential is part of the natural environment, which is also suitable for the cultivation of organic crops in all varieties. The combination of different types of factors (mentioned in the development) are the basis of high yields of different types of crops - organic or conventional. Organic crops appear as an alternative to conventional ones, but at this stage of the development of society, despite the higher quality of production, they cannot be substitutes. The latter are the basis of the food supply of the population. The ratio between the two types of crops is in favor of the traditional ones, regardless of the higher quality of the bio-raw materials (Wiezik et al., 2018). With the change of the climatic picture locally and globally and the change of the paradigm of the society in connection with its nutrition, it is possible to change the types of crops, from conventional to organic.

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