

## **CONDITION AND PROSPECTS OF DEVELOPMENT OF ORGANIC FARMING IN THE EUROPEAN UNION**

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**Abstract.** In recent years, the policy of reducing negative human impact on the natural environment and the fashion for eating high-quality food influenced the development of organic farming. However, that organic crops in the world currently only cover approx. 0.9% of agricultural land, mainly in developed countries. Europe, particularly the European Union countries, besides the North America, is a leader in terms of both the area and the number of farms, and the development of organic products market. The aim of the paper is to present both the status of organic farming in the European Union in the years 2000–2012, and synthetic prospects for the development by the year 2020. Information was analysed on the organic farming i.e. the area and structure of organic crops, and the number of certified farms. An analysis of the basic data concerning the level and rate of the development of organic farming in the European Union confirmed an increase in the significance of this method of agricultural production. As a result of the support under the CAP so far, both the number of organic farms and the area of organic agricultural land have been on the increase.

**Key words:** organic agriculture, organic farming, European Union, economic development, trends for a change

**JEL code:** Q10, Q11, Q13, Q18

### **Introduction**

One of the most important trends in the last years in agricultural production is the demand on the domestic and foreign markets for agricultural products produced within safe farming practices that protect consumers' health and the environmental ecosystems. In this case, the most promising farming system is organic farming which provides a crucial element of quality – organic food products (Ciburiene J., 2014). Organic products differ from conventional products with the fact that the first ones are exposed to significant restrictions in use of pesticides and artificial fertilizers in crop production, use of antibiotics in cattle breeding, food additives, processing aids, and other inputs as well as prohibition to use genetically modified

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organisms (Grinberga-Zalite G. et al., 2013). This results in high production cost, which has a significantly effect on the price level.

Organic system of agricultural production is a global process, and is found, although in different dimensions, on all continents. In principle, all analyses and studies concerning the possibilities for the development of organic farming in the world indicate that this is a constant trend, and that the area of organic agricultural land is going to steadily increase in the years to come (Brodzinska K., 2014). However, a very important factor in the development of organic farming is the support of the development of organic methods of agricultural production, coming from numerous countries. The number of operators applying the organic system of agricultural production in the world in 2012 amounted to nearly 2 million, which represents nearly 9-fold increase as compared to the year 2000 (with approx. 233 thousand). In turn, the area of agricultural land under organic crops in the world in 2012 amounted to 37.5 million ha. As compared to 2000, there has been a 2.5-fold increase in the area of land farmed under an organic system. However, it should be noted that organic crops in the world currently only cover approx. 0.9% of agricultural land, mainly in developed countries. Europe, particularly the European Union countries, besides the North America, is a leader in terms of both the area and the number of farms, and the development of organic products market. Unfortunately, demand for such products is not the major factor stimulating the development of organic farming. Another serious problem is the number of entities which are being converted exclusively due to higher agro-environment payments, so-called **"sofa farmers"** (Dunn J.W., et al. 2014, Pawlewicz A., 2014).

However, it should be borne in mind that the support of such a method of agricultural production in the EU, as compared to the conventional one, is regarded as an activity performed in the public interest, contributing to the conservation of the environment. Therefore, the development of organic farming is closely linked to the theory of sustainable development including the economic, social and environmental objectives. Consequently, not only the organic products market but also the environmental aptitude of a particular region are of importance (Pawlewicz A., Pawlewicz K., 2008).

The aim of the paper is to present both the status of organic farming in the European Union in the years 2000–2012, and synthetic prospects for the development by the year 2020. Information was analysed on the organic farming i.e. the area and structure of organic crops, and the number of certified farms, based on the Eurostat\* data supplemented with information from yearbooks "The World of Organic Agriculture - Statistics and Emerging Trends" from the years 2000–2014, published by the Research Institute of Organic Agriculture (FiBL) and the International Federation of Organic Agriculture Movements (IFOAM)<sup>†</sup>, in horizontal (time) and vertical (countries) arrangement. The study period included the available data from the years 2000–2012. The additional sources of information included both the documentation of institutions supporting the development of agriculture, and the literature on the subject; they

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\* <http://ec.europa.eu/eurostat/web/organic-farming>

† <http://www.organic-world.net>

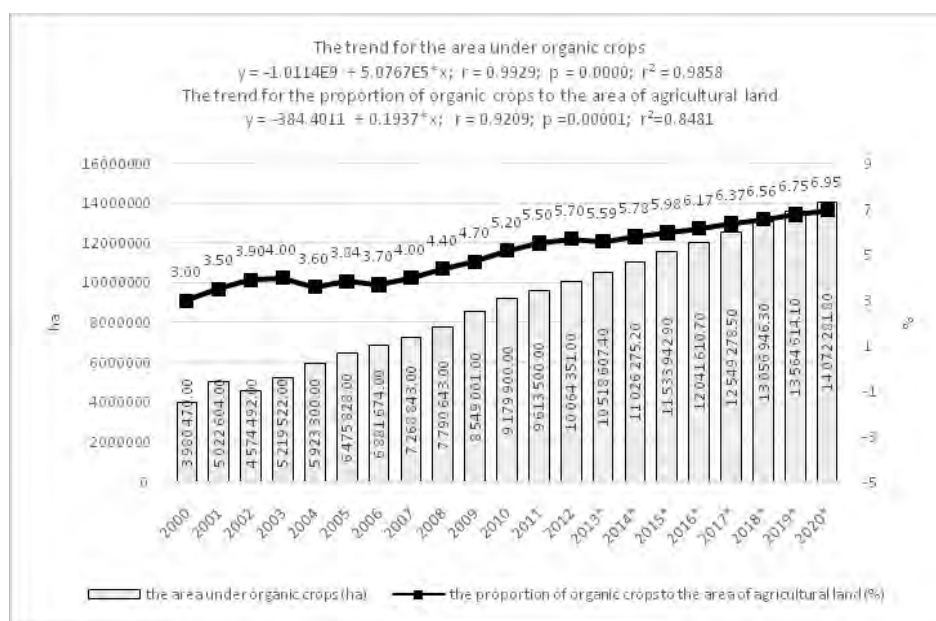
allowed the obtained results to be properly interpreted and the correct conclusions to be drawn.

In order to determine the anticipated future changes in the years 2014–2020, the author applied the deductive reasoning method based on mathematical analysis of historical data, literature on the subject, and source documents. The author used historical data for the presentation of the trend in development using the linear regression method by estimating the numerical value of the dependent variable  $y$  (response variable – numerical values of an investigated phenomenon, e.g. the number of farms, the area of organic agricultural land) based on the values of independent variables  $x$  (prediction of the dependent variable based on the independent value, e.g. a year). Trend estimation for the dynamic series was determined using a mathematical function:  $y = \beta_0 + \beta_1 x + \xi$ , where:  $\beta_0$  and  $\beta_1$  are structural parameters of the regression function, and  $\xi$  denotes a random component. Parameter  $\beta_0$  in the linear regression equation denotes the so-called absolute term, and parameter  $\beta_1$  is a regression coefficient for variable  $y$  in relation to variable  $x$ . It corresponds to the slope of linear function, and thus provides information on by how much the value of the dependent variable  $y$  will change when the independent variable  $x$  changes by one unit. In the construction of a synthetic model it was assumed that no significant changes to the existing legislation concerning organic farming would take place, and that the aid amounts would remain at a similar level, which would not affect the current level of prices of raw materials and processed products. This allowed the impact of the random component  $\xi$  to be restricted. In order to make certain of the validity of the adopted model of trend, it is necessary to specify the determination coefficient ( $r^2$ ) which is a measure of the degree to which the model explains the formation of variable  $y$ . The closer the value thereof is to 1, the better the fitting of the model is.

## Research results and discussion

The area under organic crops in the European Union in the years 2000–2012 was steadily increasing. At the beginning of the period under analysis, the area concerned amounted to nearly 4 million ha, and in 2012 it amounted to over 10 million ha. The trend as described on the basis of the regression equation indicates that the average annual increase in the area under organic farming amounted to over 507 thousand ha. Determination coefficient with a value of 0.9858 indicates that the adopted model very well presents the course of the phenomenon in the period under analysis. On this basis, it may be estimated that under *ceteris paribus* conditions, the trend may continue and, by the year 2020, the area under organic crops in the European Union may increase up to approx. 14 million ha (Figure 1). It should be noted that in the years 2004–2012, the rate of growth was nearly five times higher in the countries which entered the EU structures in 2004 as compared to the old fifteen Member States (**Facts and ...**, 2013). According to Runowski H. (2009b), in the old European Union countries with the longest tradition of organic farming, the rate of development thereof has been slowing down, and even speaking of stagnation and regress may be justified.

At the same time, with the increase in the area managed under the system of organic farming, one may observe a steady increase in the proportion of organic crops to the total area of agricultural land. In 2000, the value concerned amounted to 3%, and reached the level of 5.7% in 2012. In this period, a certain fluctuation may be observed. In the years 2004–2007, a drop to the level of 3.6% occurred (Figure 1). This resulted from the accession of new states in which the area under organic farming was small, and at the same time the area of agricultural land was rather significant, to the EU structures. In accordance with the trend being described by the regression equation, the average annual increase was 0.1937%, which allowed the indication of a forecast according to which the value in question may amount to nearly 7% in 2020. The determination coefficient was 0.8481, which also indicated a high degree of the fitting of the model of trend to the course of this phenomenon.



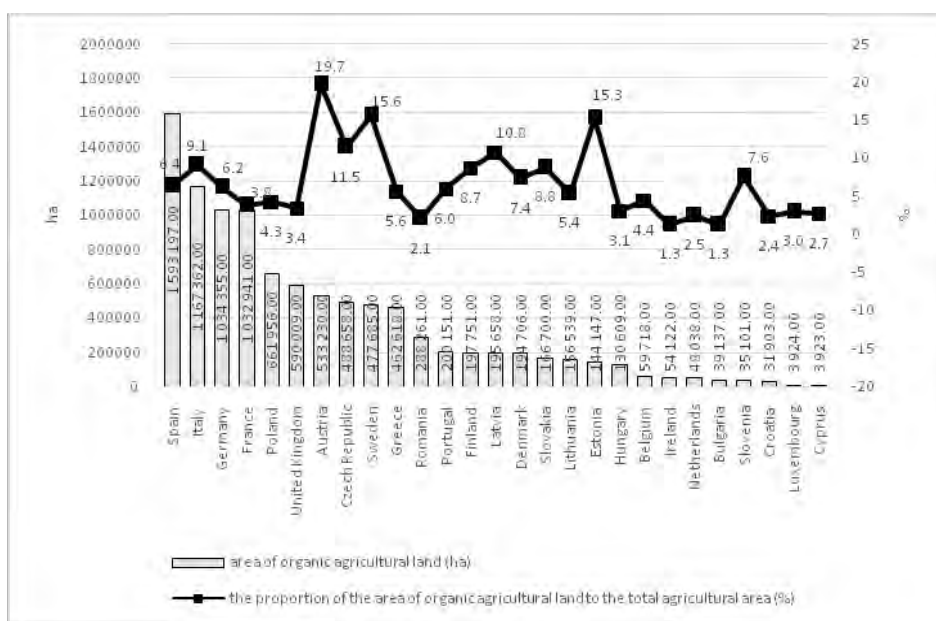
**Source:** author's construction based on: *Organic Farming ..., 2014; The World ..., 2000 - 2014.*

**Fig. 1. Changes in the area under organic crops and the proportion of organic crops to the area of agricultural land in the years 2000–2012, and a forecast for the period until 2020 in the European Union**

In terms of space, one may observe significant differences in the area under organic crops in particular countries in the European Union, which are associated with the regional specificity of agriculture. In 2012, the largest area under organic crops was found in Spain, and amounted to nearly 1.6 million ha. In turn, in Italy the area concerned amounted to over 1.16 million ha. These countries were followed by Germany with 1.034 million ha, and France with 1.032 million ha. It should be noted that Poland with 0.66 million ha was also included among the states in which the area under organic crops was large, and was followed by Great Britain with 0.55 million ha, Austria with 0.53 million ha, the Czech Republic with 0.49 million ha, Sweden with 0.48 million ha, and Greece with 0.46 million ha (Figure 2).

The spatial differences in the proportion of organic crops to the total area of agricultural land are somewhat different. This value is not correlated with the previously discussed

indicator, which means that it cannot be concluded that in the countries with a large area under organic crops, one may observe, at the same time, a significant proportion of these crops to the agricultural land in a given country, and *vice versa*. In the European Union in 2012, the highest level of the indicator under analysis was found in Austria, and accounted for nearly a fifth of the area of agricultural land in that country. A high value was also noted in Sweden (15.6%), and in Estonia (15.3%). However, in the latter country, the absolute value of the area under organic crops was small, and in 2012 amounted to over 144 thousand ha. In the Czech Republic and Latvia, one may also observe a rather high level of the indicator being discussed, namely 11.5% and 10.8%, respectively. Another country which stands out is Italy where, in turn, there is a large absolute area, and the relative value amounted to over 9% (Figure 2). The detailed changes for each country has been discussed by K. Brodzinska (2014).

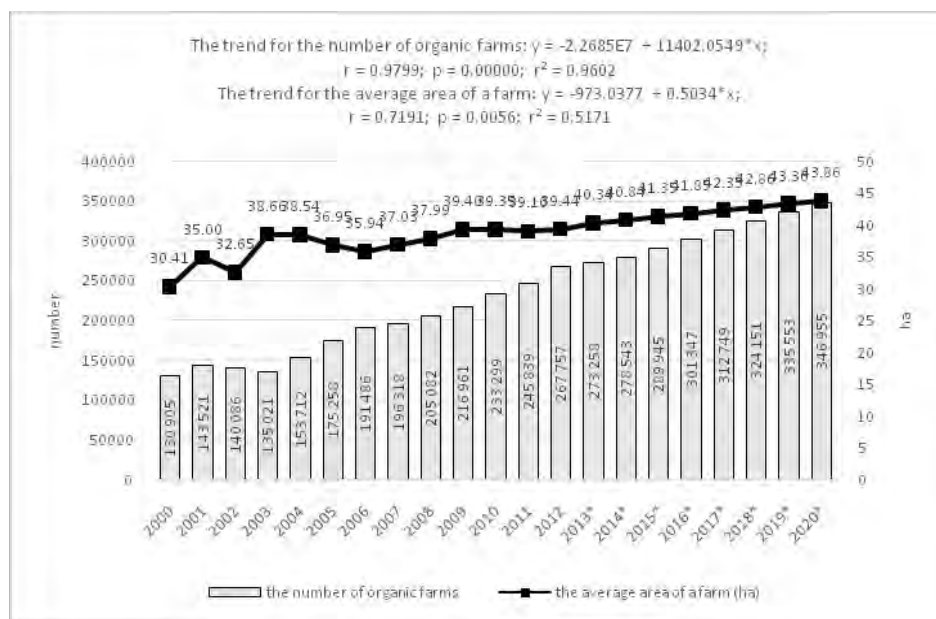


Source: author's construction based on *Organic Farming ...*, 2014; *The World ...*, 2000 - 2014

Fig. 2. **The area of organic agricultural land (ha), and the proportion of the area of organic agricultural land to the total agricultural area (%) in the European Union countries in 2012**

The number of organic farms in the period under analysis was increasing rapidly as well. In 2000, records included over 130 thousand registered operators. After the initial increase in 2001 when the number amounted to 143 thousand, there was a short-lived decline which lasted until 2003, when 135 thousand farms one could observe. In 2004, there was another increase in the number of registered operators up to 153 thousand. This was due to the accession of new countries to the European Union, and the beginning of the implementation of financial support for agriculture and rural areas of those states. This resulted in, *inter alia*, an increase in the interest in organic farming, since the aid to the area under organic crops is considerably larger, particularly in the new EU countries. In 2012, over 267 thousand registered operators were recorded (Figure 3), which accounted for over two-fold increase as compared to the year 2000.

An increase in the number of farms, as described using the regression equation, is presented in Figure 3. Determination coefficient with a value of 0.9602 indicates that the adopted model well describes the course of the phenomenon in the period of 2000–2012. It can be noticed that, on average, year after year, the number of operators in question was increasing by over 11.4 thousand. On this basis, it may be assumed that under *ceteris paribus* conditions, the number of organic farms in the European Union may increase up to nearly 350 thousand operators by the year 2020 (Figure 3). However, as Runowski H. (2009a) points out, there are numerous reasons for changes over time in the number of operators that produce using organic methods. The most important ones include differences in the economic effectiveness of organic production between countries, as compared to the conventional production. In the countries where organic production ensures incomes being either lower or comparable to the conventional production, there is a decrease in the interest in the development thereof, while in the countries in which this advantage is clear, an increase therein occurs. It follows from this that the main objectives of organic farming and an increase in the economic effectiveness of organic farming may be primarily achieved by means of incentive aid and intervention of the State.



Source: author's construction based on: *Organic Farming ...*, 2014; *The World ...*, 2000 - 2014

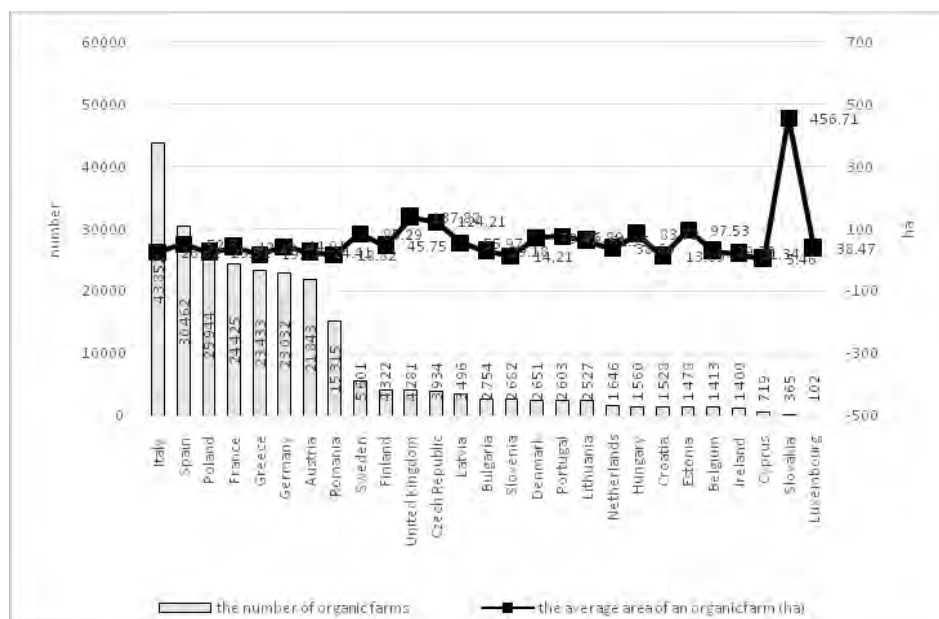
Fig. 3. **The trend for a change in the number of organic farms and the average area of a farm (ha) in the years 2000–2012, and a forecast for the period until 2020 in the European Union**

Figure 3 presents changes in the average size of an organic farm in the European Union during the study period. It should be noted that in particular years, the value concerned was characterised by significant fluctuations. In 2000, it amounted to approx. 30 ha, and in 2012 it reached a value higher by only 7 ha. The trend is not unambiguous, since one may observe both significant increases, e.g. in 2001 or 2003, and declines, e.g. in 2002, in the years 2004–2006, and in 2011. However, a statistical analysis indicates that in the period discussed, the

average increase was 0.5034 ha per annum. The determination coefficient was not as high as for previous analyses, and indicated, with a value of 0.5171, that the fitting of the model is merely satisfactory. It follows from this that in 2020, the average area of a farm may oscillate around 44 ha, which is an increase in relation to 2012 by only 16%.

In particular European Union countries, in 2012, the number of operators involved in organic crop production was greatly varied. Most registered organic farms may be found in Italy, with over 43 thousand, and in Spain, with 30 thousand. These countries are followed by a country newly accessed in 2004, i.e. Poland, with nearly 26 thousand operators. Next countries are France– 24.4 thousand, Greece – 23.4 thousand, Germany – 23 thousand, and Austria – 21.8 thousand (Figure 4).

In 2012, an average area of an organic farm in the European Union was 39.44 ha. The differences between countries are presented in Fig. 4. It should be noted that, after an analysis of this indicator in particular European Union states, the value concerned differed considerably for Slovakia, and amounted to 456.11 ha. A high level of the indicator in question was also noted in the Great Britain with 137.82 ha, the Czech Republic with 124.21 ha, Estonia with 97.53 ha, Sweden with 85.29 ha, and Hungary with 83.72 ha (Fig 4).



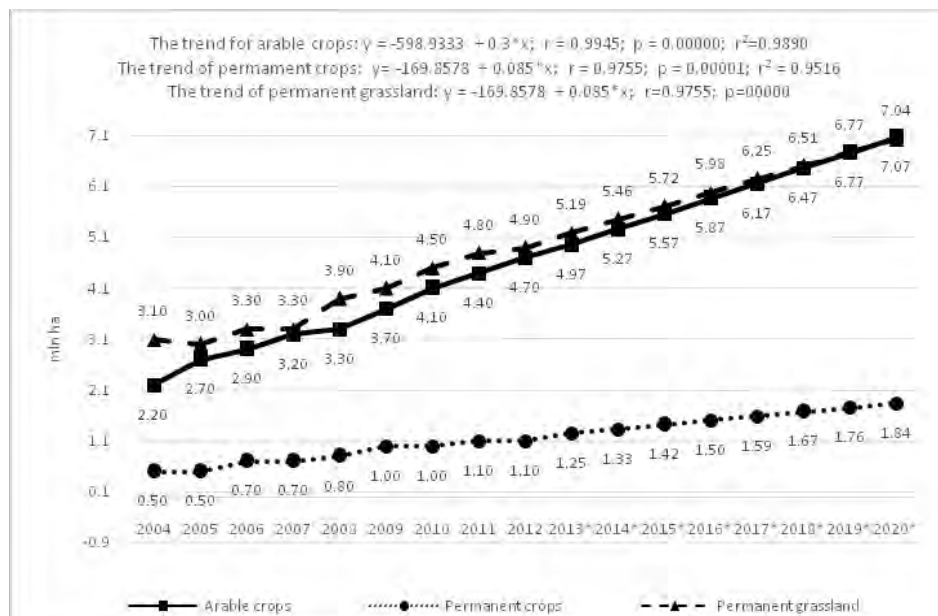
**Source: author's construction based on *Organic Farming ...*, 2014; *The World ...*, 2000 - 2014**

**Fig. 4. The number of organic farms and the average area of an organic farm (ha) in particular countries of the European Union in 2012**

In the surface structure for the main organic agricultural land, permanent crops slightly prevail, particularly in the countries in which organic animals' production, especially production of milk, is developing (e.g. Austria). In 2012, in the European Union countries, the area in question accounted for 44% of the area under organic crops (more than 4.9 million ha). In turn, the area under arable crops was slightly smaller i.e. accounted for 42% (4.7 million ha), including mainly cereals (almost 2 million ha), green fodder (1.9 million ha), high protein crops (0.24 million ha), oilseed crops (0.19 million ha), and vegetables (0.1 million ha). Perennial

crops covered the area of 10% (1.1 million ha), including primarily olives (0.46 million ha), grapes (0.24 million ha), nuts (0.17 million ha), pip fruit, stone fruit and berries (0.12 million ha) and citrus fruit (0.04 million ha).

The area under the main crops during the period of 2004–2012 was steadily increasing. In 2004, the area under permanent pasture amounted to 3.1 million ha, and reached the value of 4.7 million ha in 2012. The average annual rate of increase in the area, described using the regression equation, amounted in this case to 0.09 million ha, with the determination coefficient of  $r^2=0.9439$ . On this basis, it may be assumed that under *ceteris paribus* conditions, the area in question may increase to as much as 7.04 million ha by the year 2020. A similar trend may be observed for field crops. In 2004, the area in question amounted to 2.2 million ha, and increased more than two-fold in 2012. An analysis of the rate of change, based on the regression equation, indicates that the average annual increase amounted to 0.3 million ha, with the determination coefficient of  $r^2=0.9890$ , which shows that more than 98% of the variance of the response variable (the area under field crops) has been explained by the model. Therefore, the area in question may increase to as much as 7.07 million ha by the year 2020. The prospects of changes in the area under perennial crops are analogous. In 2004, the area in question amounted to 0.5 million ha, and increased by over 100% in 2012. The regression equation indicates annual changes by approx. 0.09 million ha. In turn, determination coefficient equal to 0.9516 indicates a well-described model, based on which it can be concluded that in 2020, the area under perennial crops may cover nearly 2 million ha (Figure 5).



Source: author's construction based on *Organic Farming ...*, 2014; *The World ...*, 2000 - 2014

Fig. 5. Trends for the area under the main organic crops in the years 2004–2012, and a forecast for the period until 2020 in the European Union (ha)

The proportion of permanent pasture to the area under organic crops in the years 2004–2007 ranged from 3.1 through 3.0 to 3.3 million ha. At the same time, rapid increase in the



area under field crops from 2.3 to 3.2 million ha could be observed during that period. The area under perennial crops also changed during that period from 0.5 to 0.7 million ha. In turn, in the years 2008–2012, all crop types were characterised by a steady increase in their area. What is significant is that the predominance of permanent pasture in relation to field crops is getting smaller and smaller. In 2004, this difference amounted to approx. 0.9 million ha, and reached the value of 0.2 million ha in 2012. According to the forecast based on a statistical analysis, the trend is going to continue, and in 2020 a scenario is possible in which the area under field crops is larger than the area under permanent pasture by approx. 0.03 million ha (Figure 5).

## Conclusions, proposals, recommendations

The conducted research into the trend for the development of organic farming in the European Union allows the following conclusions to be drawn.

1. The area of organic agricultural land in the European Union in the years 2000–2012 was steadily increasing from nearly 4 million ha to over 10 million ha. The area in question increased annually by an average of over 507 thousand ha. Based on this trend, it may be estimated that under *ceteris paribus* conditions, the area under organic crops in the European Union may increase to as much as 14 million ha by the year 2020.
2. The number of organic farms in the period under analysis was increasing rapidly. In 2000, over 130 thousand registered operators were recorded, and in 2012, records included as many as over 267 thousand registered organic farms. In the years 2000–2012, the number of certified agricultural operators was increasing annually by an average of 11.4 thousand. While forecasting the development of organic farming by the year 2020, using the existing course of the phenomenon in time, it may be assumed that there are going to be nearly 3 thousand of them in the European Union.
3. An analysis of the basic data concerning the level and rate of the development of organic farming in the European Union confirmed an increase in the significance of this method of agricultural production in nearly all EU Member States. What deserves special attention is the strong interest in this method of management among new EU members, particularly in Poland and the Czech Republic. These states are characterised by both a large area under organic crops and a large number of organic farms. This results in the level of concentration of organic farming in the EU getting impaired. The previous dominance of Italy, Germany, Spain, Great Britain and France in the development of this system of agricultural production over the other countries has been on the decrease. The EU membership which guarantees both more stable financial and legal conditions and new sales markets has resulted in the EU-12 states farmers' evident increase in the interest in the conversion to management manner being consistent with the organic farming criteria.
4. In the structure of areas under organic crops in the European Union, permanent pasture accounted for 44%, and field crops for 42%, in which cereals (almost 2 million ha) and green

fodder (1.9 million ha) were predominant. It should be noted, however, that since 2000 the predominance of permanent pasture has been getting smaller. While forecasting the development of organic farming by the year 2020, using the existing course of the phenomenon in time, it may be assumed that in the future it is the area under field crops that is going to increase at the expense of permanent pasture, which may indicate an increase in the plant and food commodity production resulting from an increase in demand.

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