

## **ORGANIC AGRICULTURE IN ROMANIA - AN IMPORTANT RESOURCE OF QUALITY RAW MATERIALS FOR INNOVATIVE FOODS**

**AUTHORS: SAVESCU PETRE, DOBRE MARIAN, BADESCU GABRIEL**, Faculty of Agronomy, University of Craiova  
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### **ABSTRACT**

*Organic foods, functional foods, Food supplements are designed and built from organic agricultural raw materials and natural food additives. In the last ten years, in Romania, there has been a significant increase in ecologically certified areas, an increase in organic cereal crops, areas cultivated with green harvested plants and permanent crops (orchards, vines, fruit bushes). These increases facilitate the obtaining of foods with high nutritional density and an increased processing efficiency. All these are part of the Sustainable Development Strategy of Romania in the period 2020-2030, approved in EC.*

### **INTRODUCTION**

Organic products can be basic raw materials in the construction of innovative foods with high nutritional density. In recent years, in Romania there have been a number of beneficial changes in the system of organic agricultural production.

These products are free of traces of pesticides, traces of plant hormones, traces of treatments and therefore, valuable bio-compounds can be separated more easily and used in the design and construction of innovative foods with high added value. By using inoculated raw materials and separation-concentration techniques of important compounds (antioxidants, alkaloids, natural dyes and pigments, pro-vitamins and vitamins) can be made very valuable products. For this purpose, can be used supercritical extraction techniques (SFE), fineness centrifuges, final product lyophilization. It is also possible to develop the "cascade" processing technologies for by-products and food waste. Through these, both bioeconomy (Bio-Based-Industry) and Food Waste Control Strategies are implemented.

The paper presents the evolution of operators in organic farming systems, the number of areas cultivated with various plants - in organic farms in the last 10 years. These are important factors in the development of the organic processing sector in Romania, the

link left behind, in organic farming systems. The development of the “premium” products sector (functional foods, food supplements, traditional foods - certified under quality policy standards) is an important objective of Romania's Sustainable Development Strategy - in the Horizon 2020-2030.

## **MATERIAL AND METHOD**

In order to be able to document the evolution of the lands in ecological agriculture, of the operators involved in this system, in Romania - syntheses of the data reported by the Control Bodies to the Romanian Ministry of Agriculture were used. A number of other data were obtained from direct reporting (as director of an important Certification Body involved in organic farming systems) and from correlations established from the network of stakeholders in this system (<https://www.madr.ro/>).

Extraction tests were also performed using a specialized supercritical carbon dioxide extraction system. The system used is Helix SFE - Natural Products, one of the most advanced profile systems, made by Applied Separation U.S.A. This system is organized in such a way that fractions of bio-compounds can be extracted at low temperatures and high pressures, without affecting their chemical structure. The development of certain categories of vegetable and animal farms in a certified organic farming system is an important step in the development of advanced organic processing systems. MILD FOOD PROCESSING Techniques can also be used and the obtained products can be used successfully in the diet of certain categories of consumers with health problems. Thus, a series of very valuable food supplements could be developed - starting from underutilized food by-products, but obtained in an organic farming system ( Savescu P., 2019; Savescu P., 2020).

The use of ion-charged bio-membranes in the plasma field - in mass and impulse transfer can lead both to obtaining premium final products - very valuable and to increasing the final extraction yield (Savescu P., and col., 2020).

The knowledge of the mechanisms of redox reactions, of the mode of action of some antioxidants from vegetable products, in certain metabolic processes bring an extra quality to the final products (Savescu P., 2021).

## RESULTS AND DISCUSSIONS

As can be seen from the graph in Figure 1, the number of operators in the organic farming system has been declining (between 2012-2017). After this period, there was a continuous, slight increase after the merging of the lands. When financial subsidies increased - in support of this system, the number of green operators increased by about 3 times - between 2010 and 2011 and 5 times between 2012 and 2010.

Since 2016, the Total Area in Organic Farming has grown steadily; between 2016 and 2020 this area doubled (graph in figure 2).

The graph in Figure 3 shows the same trend (doubling - in the area cultivated with whole grains), between 2016 and 2020, these being the main organic crops.

Dried Legumes were poorly represented on organic farms (chart in Figure 4). Peaks of production were recorded in 2018 and 2019 (before the pandemic time), as a result of the application of specialized support programs (e.g. TOMATINA) additionally funded by the Ministry of Agriculture. The decrease in sales in this sector, during the pandemic time, show the production in 2020 to be at the same level of 2010. However, it can be seen that in 2020 it remains over 230% higher than in 2016.

For Fresh Vegetables (chart in figure 5), the production high values were recorded in 2014 (also as a result of the application of support programs for agriculture). Currently, the crisis caused by the viral pandemic has caused a decrease in sales, so that in 2019 and 2020 there were major decreases in the sector.

As can be seen in the graph in Figure 6, the crops of Orchards, Vines, Fruit Trees, Nuts have grown steadily in recent years. Operators have sensed the long-term growth potential of these crops. Between 2010 and 2020 these crops have grown 6.85 times.

The pastures and hayfields have started to grow since 2016-2017, and in the last 3 years they have increased almost 3 times (the graph in figure 7).

All these increases were due to the applied financing programs, the high-performance equipment - able to cover the technological works on a larger area and in a short time.

The uncultivated land fell continuously; thus, in 2020 they reached about 50% compared to those specific to 2010. However, the values recorded are relatively small.

## CONCLUSIONS

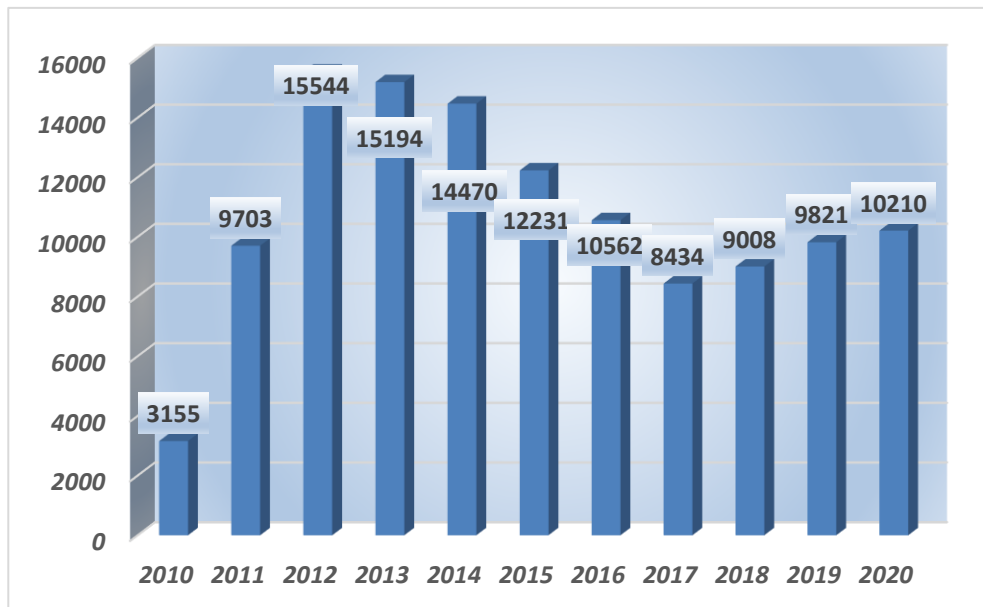
Following the analysis of the cumulative results, a series of conclusions were drawn:

- Organic farming is an important sector, which can produce premium products with significant added value;
- A good orientation in the selection of agricultural crops can create competitive advantages of production and quality;
- The application of high-performance processing technologies and innovative techniques (SFE, Techniques using ionized bio-membranes, MILD FOOD PROCESSING) can lead to the preservation of concentrations of valuable bio-compounds in the final products;
- The use of local seeds and varieties can lead to higher yields and high quality;
- The use of Good Practices of organic agriculture can lead to a Sustainable Development and are part of the last National Strategy.

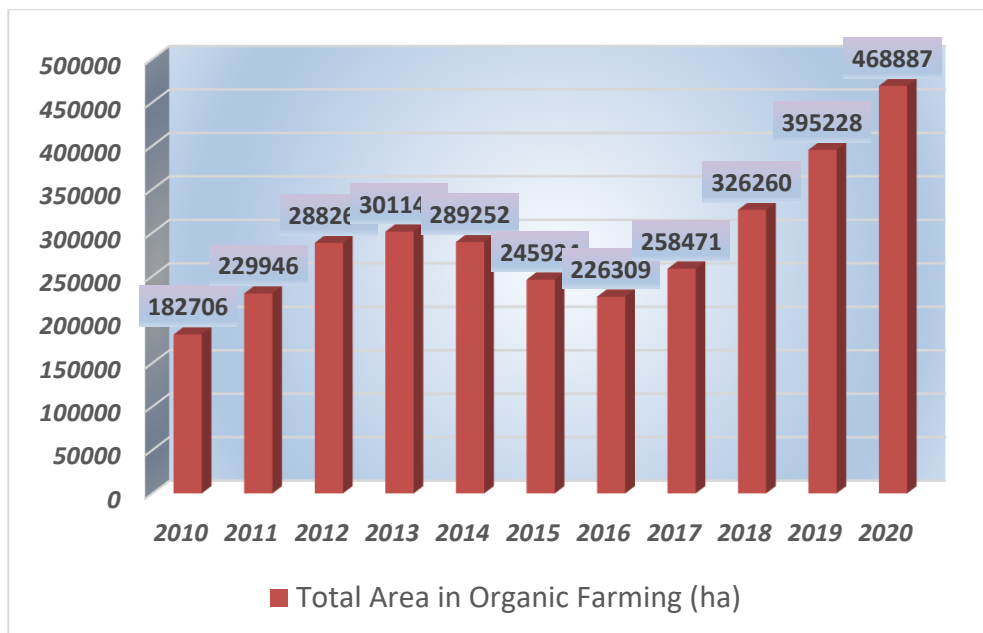
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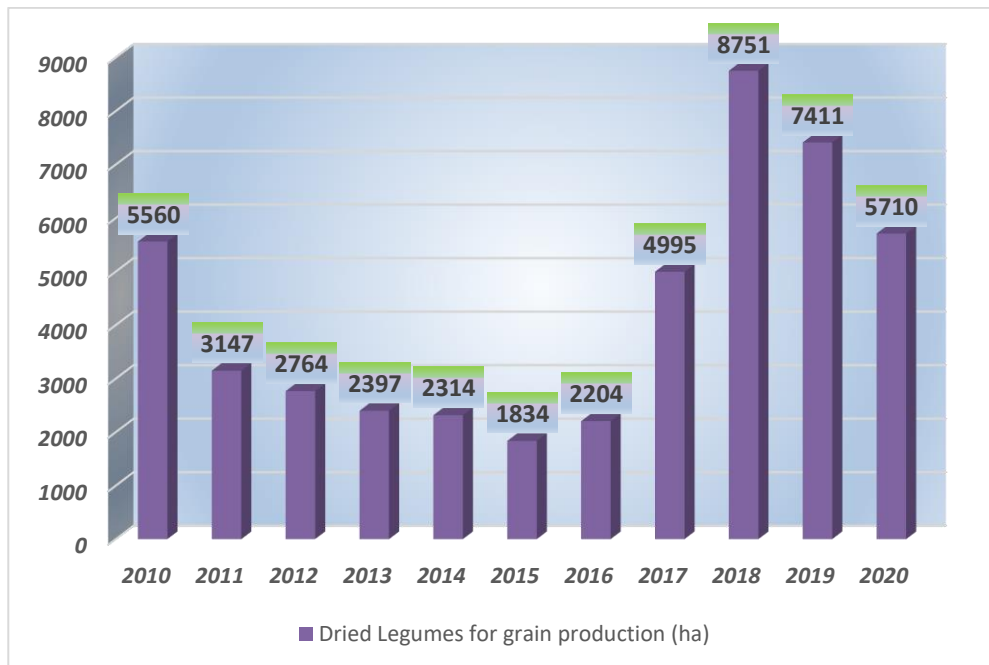
**Figure 1 – Total number of certified operators in organic farming**



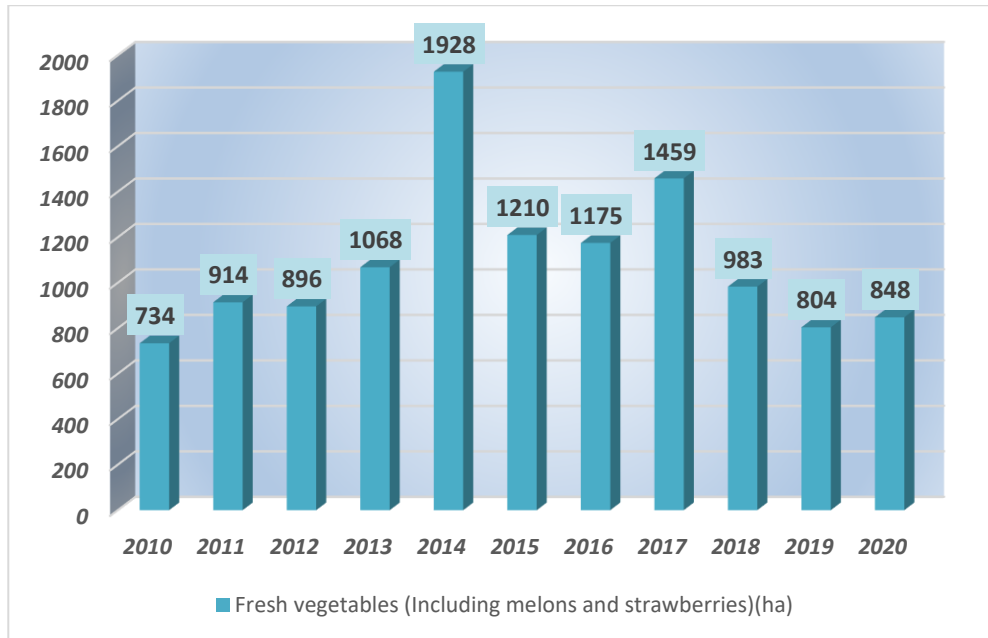
**Figure 2- Total Area in Organic Farming (ha)**



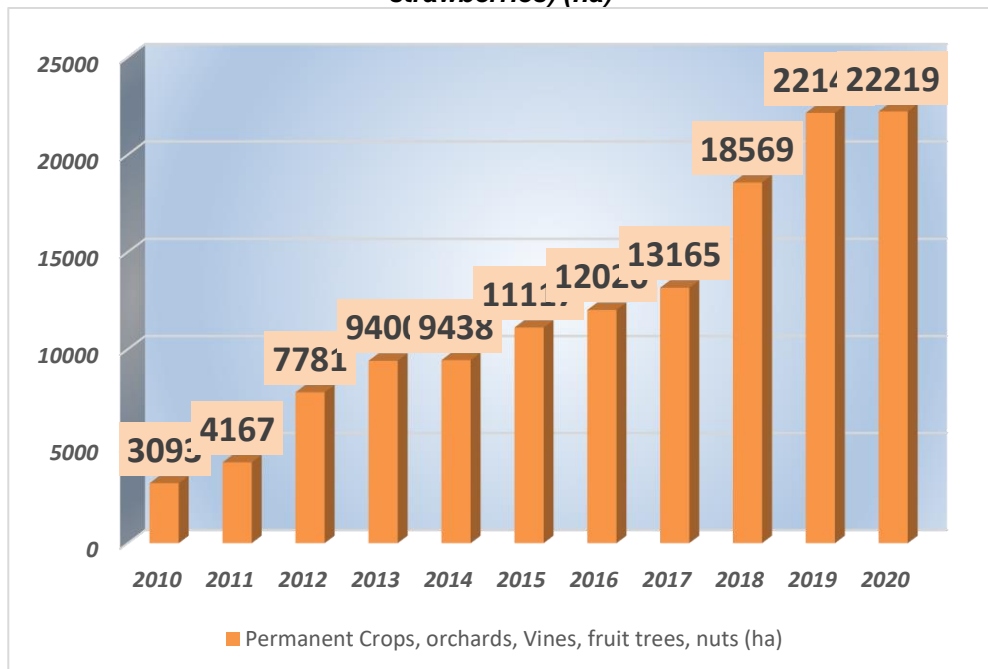
**Figure 3 – Total surfaces with whole grains (ha)**



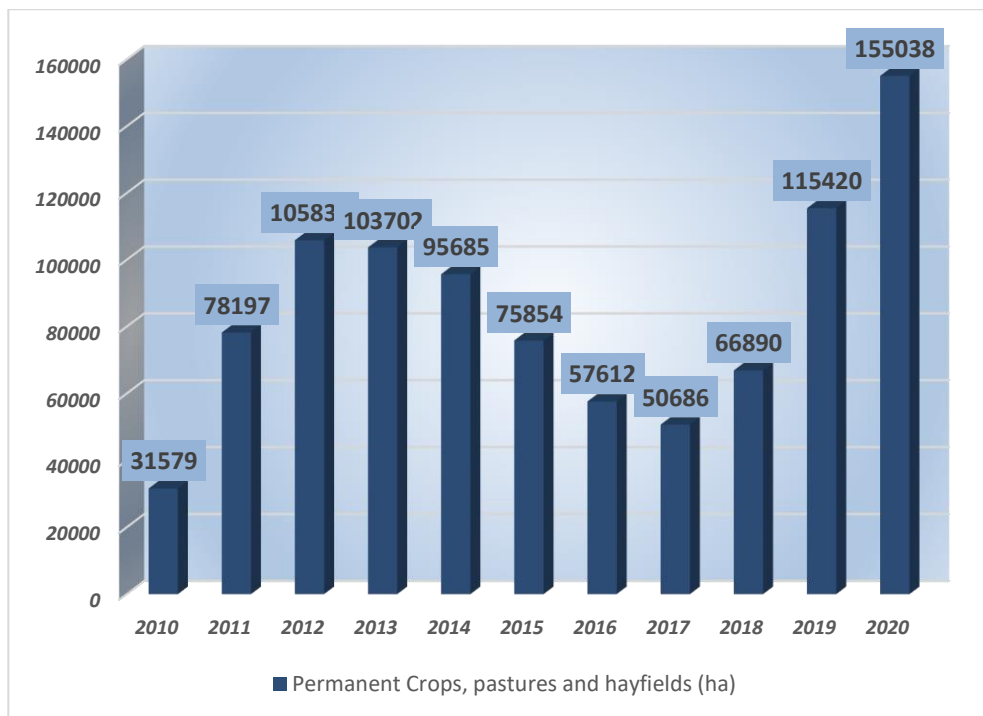
**Figure 4 – Total surfaces with dried legumes for grain production (ha)**



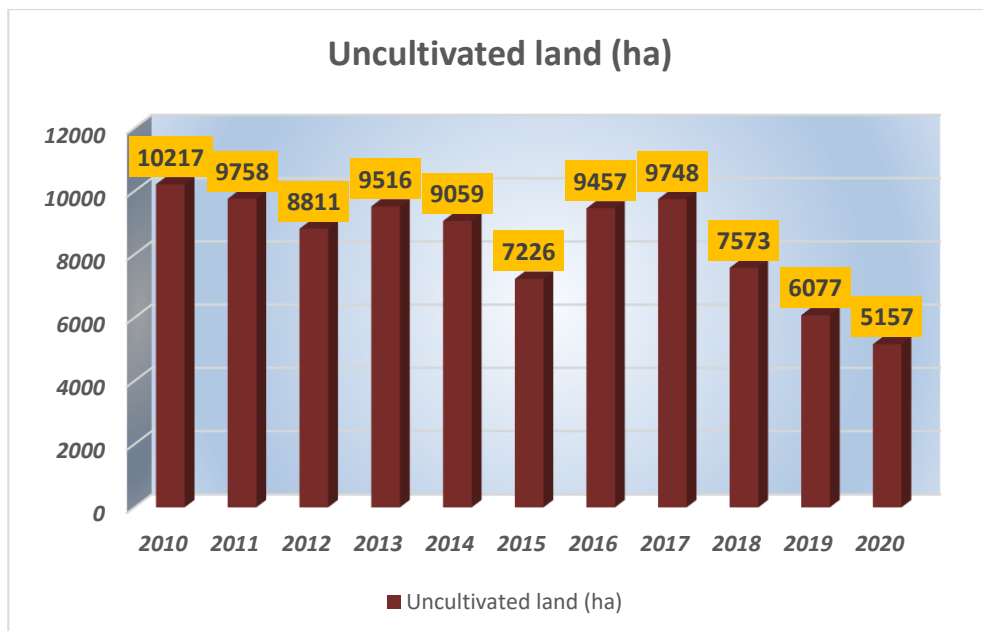
**Figure 5 – Total surfaces with fresh vegetables (including melons and strawberries) (ha)**



**Figure 6 – Total surfaces with permanent crops, orchards, vines, fruit trees, nuts (ha)**



**Figure 7 – Total surfaces with permanent crops, pastures and hayfields (ha)**



**Figure 8 – Total surfaces with uncultivated land (ha)**