

## Relationship between the Sustainable Models of Production in Agriculture and the Challenges to Their Development in Bulgaria

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### Abstract

Contemporary farming offers new opportunities and poses new challenges to meeting the demand for safe and quality food. Technological innovations in the sector relate to increased environmental protection and applying environmentally friendly farming practices. At the same time, they contribute to improved management and higher profitability of innovative farms, in addition to meeting consumer demand for green products. Integrated farming is a practical model of food production in compliance with the principles of sustainable farming. This model illustrates the manner in which contemporary farming may observe all economic, environmental and social aspects of sustainable development. Applying that model in food production requires focusing on the rational exploitation of natural resources and observing high environmental standards. As a matter of fact, organic farming has already become an established model for the development of innovative farms and its development over the last years indicates significant dynamic trends in Bulgarian farming practices. This paper focuses on the need to develop sustainable farming by managing the components of the farming system through sustainable farming models. It also examines the relation among conventional, integrated, and organic farming and puts an emphasis on existing opportunities for developing organic and integrated farming in Bulgaria. The paper also reviews some of the challenges faced by two sustainable farming models, namely, organic and integrated farming.

**Keywords:** farming; sustainable development; sustainable farming practices; relation; integrated farming; organic farming; challenges

### I. Introduction

In contemporary farming realities it is essential to identify the economic and social advantages of developing a sustainable agricultural sector. The focus of attention is increasingly on the production of quality products while at the same minimizing damages to the environment and establishing the prerequisites for protecting soils, water, biodiversity, and wildlife. It is therefore necessary to identify environmentally friendly methods and practices which will prove beneficial to both nature and people's health.

Integrated farming of plants and plant products is one of the available models for sustainable development of farming as a means of filling the emerging market and entrepreneurial niches on Bulgarian market with safe and quality products. Integrated farming allows the optimization of farming systems towards alternative models of sustainable development and equips agricultural producers with serious grounds for investment projects related to the development of sustainable agriculture. Over the last few years, organic farming has been one of the sectors developing fast in Bulgaria despite the crisis, the size of farmlands and the number of operators included in the system of control growing continuously (see further section 5). In addition, agri-environment schemes and their amendment motivate a growing number of entrepreneurs to join the innovative trend and to increase the size of cultivated lands<sup>2</sup>.

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<sup>2</sup>Nikolova, M., (2014). Problems of innovative development concerning organic production in Bulgarian crop growing farms. Збірник наукових праць – Проблеми інноваційного розвитку економіки України, Частина II, 64. Дніпропетровськ.

## 2. The Need for Developing Sustainable Farming

*There are prerequisites for developing environmentally friendly sustainable farming since its principles have been violated for years on end in an attempt to obtain higher crop yields without consideration for the effect which a similar policy would have on future generations.* The lack of sustainable development has resulted in large areas of farmlands on which monocultures (single crops) are grown. Intensive ploughing for a prolonged period of time has led to the occurrence of soil erosion. Having the boundaries between fields removed and repeatedly ploughing slopes by turning the outer layer of soil has resulted in severe water erosion. The excessive use of mineral fertilizers (in order to obtain high yields) has brought about soil acidification in a number of agricultural regions. What is more, the mechanical introduction of foreign techniques to the growth of traditional crops like corn, wheat, etc. required using increased amounts of mineral fertilizers and chemical agents for crop protection without consideration for possible negative consequences.

Nowadays crop production faces a number of difficulties which pose a challenge to its competitiveness on the global market. Some of the underlying reasons are the considerable loss of soil fertility and the large-scale use of expensive external nutrients (nitrogen and phosphorus, above all) for which European farming is almost entirely dependent on imports or on fertilizers produced through capital intensive industrial processes which generate greenhouse gases<sup>3</sup>. It is therefore of vital importance to adequately manage and employ strategies for sustainable management of the crops grown, so as to preserve soil fertility and prevent its further loss. Inadequate management of the farming system components (i.e. soil, water, bio diversity, etc.) and extreme dependence on external resources (fertilizers, pesticides) in intensive farming result in significant economic losses for farmers, pollute the environment and damage people's health.

Making the *transition to sustainable farming is a continuous and consecutive process.* For farmers, it relates to the requirement for a series of small, practical and realistic steps. Any right decision matters and may contribute to the progress of the entire system for sustainable farming development. A major factor in the process of reconsidering the approaches applied to the management of the contemporary farming system is the evolution of EU policy in terms of agriculture development in EU member states. With its accession to the EU, Bulgaria has joined a community which is aware of the necessity to preserve farmlands and natural resources. More attention is being paid to the production of quality products while at the same time reducing the threats posed to the environment and ensuring safety net mechanisms for preserving soil, water, bio diversity and landscape diversity.

When Bulgaria joined the EU in 2007, it made the Common Agricultural Policy a key factor for the development of Bulgarian agriculture. And although over the last years there have been certain positive effects in the development of the sector as a result of the inflow of EU funds and national premiums, farming is still largely characterized by low competitiveness and poor market orientation. This is due to the problems accumulated through the years. The collapse of planned economy and the crisis which accompanied it had a dramatic effect on farming<sup>4</sup>.

At a later stage, the application of the Common Agricultural Policy in the period from 2007 to 2013 required a more efficient organization of the agricultural sector so that both parties, i.e. government bodies and farmers would assume their share of duties and responsibilities. We could hardly expect to solve the problems faced by Bulgarian farming by merely applying the measures adopted in the Common Agricultural Policy<sup>5</sup>.

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<sup>3</sup>Draft Horizon 2020. Work Programme 2014-2015. Food security, sustainable agriculture and forestry, marine and maritime and inland water research and bioeconomy, p. 13.

<sup>4</sup>Hadzhieva, V. *Ustoychivorazvitienezemedelieto v Bulgariya* (In English: Sustainable development of agriculture in Bulgaria). *Ikonomicheski alternativi*, No. 5, 2007, p. 34.

<sup>5</sup>Tourlakova, T. *Problemi i predizvikatelstv apredbalgarskotozemedelie v parvitegodinisleprisaedinyavanekam ES* (In English: Problems and challenges faced by Bulgarian agriculture in the first years after the accession to the EU). Conference papers. Varna, 2010, p. 26.

The new Common Agricultural Policy (2014-2020) is much more flexible, 'greening'<sup>6</sup> of agricultural producers being one of its milestones. The objective of the new CAP is to ensure that all farmers in the EU will provide benefits to climate and environment through their daily activities. It is therefore necessary to introduce environmentally friendly farming practices and ecologically oriented technologies in the production of crops. This means that agricultural ecosystems need to be made more stable and sustainable by reducing their dependence on additional external energy. Developing *sustainable agriculture* has also been provoked by the opportunity to organize farming in a manner which will ensure viable production of safe and quality food while at the same time guaranteeing constant revenues to farmers.

Sustainable agriculture not only deals with a number of environmental and social issues, but it has the potential to provide innovative and economically viable opportunities to agricultural producers, consumers and other stakeholders along the entire food chain<sup>7</sup>. One of the main objectives of sustainable agriculture is to reduce to a minimum the negative impact of used chemical agents both on the environment and on people. Developing sustainable agriculture requires continuously maintaining the stability of the system through scientifically based crop rotation, soil conservation treatment, the use of organic and green manure, and fighting weeds, diseases, and pests with limited or no use of pesticides.

*Plant protection* is the major factor which distinguishes *sustainable agriculture* from unsustainable intensive farming. In the past, pest control strategies aimed at the total destruction of harmful species, while no attention was heeded to their role within the structure of agricultural ecosystems themselves. The predominantly used method was that of chemical agents whose norms of use were continuously increased. The negative consequences of the intensive application of chemical agents in plant protection include totally ignoring the abilities and the mechanisms of ecosystems for self-regulation and the greater proliferation of pests after conducted treatment with pesticides.

One of the key elements of agro technology in sustainable agriculture is *integrated plant protection* which includes all familiar contemporary methods. In compliance with the requirement to produce environmentally clean products, the spread of weeds, plant diseases and pests on crops is limited to the so-called *economic threshold of harmfulness*, by predominantly applying mechanical and biological methods, i.e. selecting the appropriate varieties and hybrids for the particular climate; rotating crops so that they would clear the soil from disease agents and pests that might threaten the next crop; using specialized predators (for instance, ladybugs against aphids), protective plants<sup>8</sup>, mixed cropping<sup>9</sup>, etc. As for chemical plant protection means, only harmless or less toxic substances are considered acceptable, such as sulfur, lime, Bordeaux mixture, etc.<sup>10</sup>. Everything we have taken into consideration so far indicates that *there are sufficient prerequisites for developing environmentally friendly farming technologies in contemporary agriculture*. The latter should contribute to the improved viability of agricultural ecosystems, aiming at sustainable use of pesticides, and reducing to a minimum the use of additional energy (mineral fertilizers, pesticides, etc.) in the systems in order to ensure the production of quality food.

Integrated production of plants and plant products *still isn't very popular as an environmentally friendly practice in Bulgaria*, yet it, too, is an element of sustainable farming. In order to promote the principles in the sphere of integrated production at a European level, in 2001 the so-called 'European Initiative for Sustainable Development in Agriculture' (EISA) was established. One of the first objectives of the organization was to design a Common European Codex for Integrated Farming<sup>11</sup> to be applied by the Food and Agriculture Organisation of the United Nations in identifying sustainable farming practices.

<sup>6</sup>According to the new Common Agricultural Policy (CAP), 30 per cent of all direct payments must be related to the implementation of activities such as crop diversification, maintenance of permanent grassland and ecological focus areas.

<sup>7</sup>Nikolova, M., G. Sirashky. Agrarnaekologiya (In English: Agricultural ecology). AI Tsenov – Svishtov, 2010, p. 52.

<sup>8</sup>For instance: carrots may be used against onion fly; garlic may be used to prevent gray mold of strawberries; horse radish may be used against Colorado potato beetle, etc.

<sup>9</sup>For example, when corn and bean crops are grown together, green beans attract the larvae of corn pests.

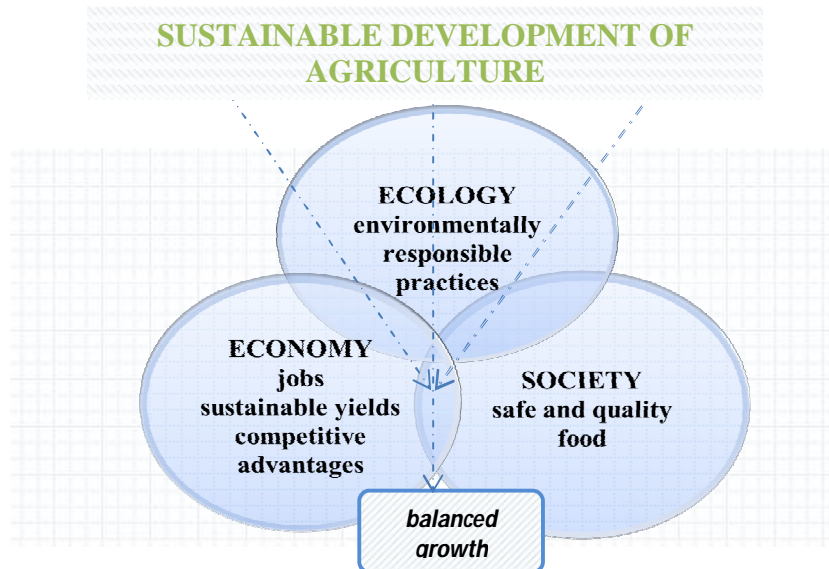
<sup>10</sup>See further: Nikolova, M., G. Sirashky. Agrarnaekologiya (In English: Agricultural ecology). AI Tsenov – Svishtov, 2010, pp. 168-175.

<sup>11</sup>Common Codex for Integrated Farming. In 2006, the EISA first published and then in 2012 updated the mechanism it adopted for reasonable European farming.

In 2002, the Assembly of European Fruit and Vegetable Growing and Horticultural Regions (AREFLH) supported the initiatives in favour of European regulation and in April 2013 it published the first *Guidelines of European Practices in Integrated Production*<sup>12</sup>.

The ultimate objective of developing sustainable farming today must be producing and consuming safe and quality food, in addition to using available resources in an environmentally responsible manner, reducing costs, and minimizing our impact on the environment (see fig. 1).

**Figure 1: Guidelines for achieving sustainability in the contemporary development of agriculture**



Sustainable development of rural areas in Bulgaria and the country in general, requires adopting a new perspective to the development of organic farming as well as to the other integrated agri-environmental activities. These are specific practices which may result in better stability for ecosystems, preservation and development of natural resources and lands, and revived rural economy<sup>13</sup>.

### 3. Management of the Agricultural System Components Under Sustainable Models of Production

The inappropriate management of the agricultural system components (soil, water, biodiversity, etc.) and the excessive dependence on the use of external resources (fertilizers, pesticides, etc.) in the intensive cultivation of agricultural crops leads to economic losses for farmers, pollution of the environment and harmful effects on people's health. One of the advantages of organic farming is the protection of the environment, i.e. the soil, water, biodiversity, and landscapes<sup>14</sup>. One of the methods for increasing the effectiveness of organic farming is through managing soil fertility. This implies improving the nutrition of soil, protecting and improving its structure and properties. This means improving the factors responsible for the processes in the soil and the absorption of nutrients by plants. As a result, this improves the quality of production and its safety for the health of people and animals<sup>15</sup>. With reference to this, the need of introducing ecologically – friendly, agricultural practices and technologies for the production of crops is increasing. This results in stabilization of the agricultural ecosystems and reduces their dependence on additional external energy.

<sup>12</sup>[www.areflh.org](http://www.areflh.org)

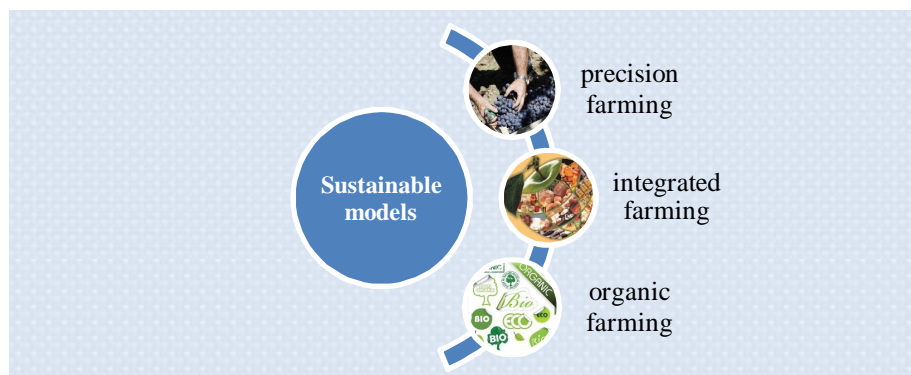
<sup>13</sup>Nikolova, M., (2013). Challenges to organic agriculture in Bulgaria. *Ekonomskie teme*, 1, Економски факултет Ниш, p. 195.

<sup>14</sup>Grigorova, Z., Arabska E. (2013). Opportunities of organic farming for biodiversity preservation and sustainable development. *New Knowledge Journal of Science*, p. 145.

<sup>15</sup>Kanazirska, V. (2012). Soil Fertility Management in Organic Agriculture. *New knowledge - University of Agribusiness and Rural Development Edition*, No 3, p. 25.

The contemporary development of agriculture is directed towards implementing more sustainable practices. This implies not only broadening the scope of organic farming<sup>16</sup> but also including other ecologically oriented practices such as the integrated management of pests in the precision, conventional and integrated cultivation of crops and plant products (see figure 2).

**Figure2: Sustainable production models in contemporary agriculture**



The integrated production of crops and plant products is an element of sustainable agriculture. It is also a possible alternative for ecologically friendly development of farms. According to **the National Strategy for Sustainable Development of Agriculture in Bulgaria for the period 2014 – 2020**<sup>17</sup>, since 2003 the new CAP has been facing the serious challenge of developing a highly productive and effective agricultural sector which is also highly sustainable, ecologically oriented, multifunctional and at the same time competitive on international markets. The goal is to meet increasing requirements of food, fodder and bio fuel as well as of high quality, safety food associated with the high standards of the European lifestyle.

According to the definition in the Directive on sustainable use of pesticides of 2009, **Integrated Pest Management (IPM)** implies the careful study of all available methods of crop protection and the consequent integration of appropriate measures for restricting the population of harmful organisms. IPM also means maintaining economic and ecologically reasonable levels of application of crop protection products and other forms of interference and reducing or minimizing the risks for the environment and people's health. IPM in agricultural crops is directed towards the production of healthy crops by reducing the damages on agroecological systems to the maximum and facilitating the natural mechanisms of pest control.

The management of pests by applying low levels of pesticides involves Integrated Pest Management as well as practicing organic farming under the provisions of Regulation (EC) № 834/2007<sup>18</sup>. The crop protection products allowed for use in organic farming are in line with Annex 2 of Regulation (EC) № 889/2008<sup>19</sup>, Ordinance № 1/2013<sup>20</sup> and Ordinance № 4/2015<sup>21</sup> of the Ministry of Agriculture and Food (MAF) on organic farming and the last amendment of the Law on Plant Protection from 2015. The use of a particular pesticide is permitted in cases when there are no available organic, physical and selection solutions or appropriate agro technological practices.

<sup>16</sup>The article puts an emphasis on the two of the sustainable models of production, i.e. integrated and organic farming.

<sup>17</sup>Stankov, I., R. Popov and others. National Strategy for Sustainable Development of Agriculture in Bulgaria for the period 2014 – 2020, Sofia 2013, p. 7

<sup>18</sup>Regulation (EC) № 834/2007 of 28 June 2007 on organic production and labeling of organic products and repealing Regulation (EEC) № 2092/91 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs.

<sup>19</sup>REGULATION (EC) No 889/2008 of 5 September 2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control.

<sup>20</sup>Ordinance № 1/2013 on the application of the rules of organic production of plants, animals and aquaculture, plant and animal products, aquaculture products and foods, their labeling and control of production and labeling. Promulgated in the State Gazette, issue 16 / 02.19.2013, last amended SG, issue 63 / 01.08.2014.

<sup>21</sup>Ordinance № 4/2015 on the implementation of Measure 11 "Organic Farming" of the RDP for the period 2014 – 2020.

Organic producers have access to training on Integrated Pest Management in the accredited institutes and universities in the field of plant protection, e.g. the Agricultural University–Plovdiv, the University of Forestry – Sofia, etc. The training programmes are developed by these institutions and are approved by the Managing Director of the Bulgarian Food Safety Agency. In contemporary agriculture, producers are obliged to use practices for pest control, which limit the use of products for plant protection. This can be achieved by applying higher level of professionalism in the sphere of plant protection *either by improving the farmers' own competences or by hiring the services of professional consultants.*

The management of agricultural systems applying integrated and organic production methods refers to the *priority implementation of organic, physical and non-chemical methods and products for crop protection or their substitution with the mechanisms for natural control of economically important pests on agricultural crops.* This naturally leads to minimizing the risks for the health of both people and animals and the environment. The decision to start practicing organic farming involves important changes in the management of farms. The fact that this decision requires considerable investments in consulting services, training, control and the availability of sufficient financial incentives should also be taken into account.

The success of integrated production is based on the following elements:

- ✓ Information;
- ✓ Technologies;
- ✓ Management.

**Information**, by rule, is the most valuable resource for agricultural producers. Timely and accurate information is of great importance on all stages of production – from the planning to the soil treatment after harvesting. What is more, in the integrated production of crops and plant products the information is important on every stage of the development of plants. Only in this way, can farmers minimize expenses and maintain the population of species.

**Modern technologies** come second when farmers look for innovative production solutions. Nowadays producers can choose between conventional and ecologically friendly farming (either organic or integrated). In all cases, however, they should consider carefully the benefits for their production by taking into account their personal priorities.

**Management** is the third element of key importance for the functioning of farms. In order to be effective, integrated production requires high level of professionalism and taking reasoned decisions. The multiple aspects of the effects (social, economic and ecological) of integrated production lead to increasing the sustainability of rural economy and at the same time impose increased requirements to managerial practice.

The managerial skills in crop farms are the main factor, which determines the amount of received payments. The high quality management, based on specific knowledge of agro ecosystems is a prerequisite for better results. Precisely this necessity of specific knowledge about the life cycle of diseases, pests and weeds in crops explains the complexity of management practice at these farms. The sustainable management of innovative farms is a prerequisite for balanced economic and social policy concerning not only the environment but also the local competitive advantages and maintaining the viability of rural regions.

#### **4. Interrelation between conventional, integrated and organic farming**

The models of conventional, integrated and organic production are more or less known practices. They have differences as well as similarities but in any case, they represent different possibilities for producing food products. The choice of contemporary farmers in Bulgaria, however, depends on their beliefs, attitudes and the availability of enough motivating factors.

**Conventional agriculture** includes some of the practices and techniques also used in integrated farming. The compulsory nature of integrated pest management, which has been imposed since 2014 through the Directive on sustainable use of pesticides from 2014<sup>22</sup> is one more element of the similarities between the two production models.

<sup>22</sup>Directive [2009/128/EC](#) on establishing a framework for Community action to achieve sustainable use of pesticides, 2014.

In other words, **integrated production** sets the direction of development, which conventional farming is gradually undertaking. This can also be viewed as one of the most important contributions to the future development of integrated production or crops and plant products in contemporary farms.

Ultimately, integrated production is an example of combining traditional methods and modern technologies with the aim of applying ecologically friendly agricultural practices and meeting the demand for safety, quality products. It is possible that some farmers can also consider integrated production as a **conversion model to organic farming**. Integrated pest management (IPM) is an **intermediate step between conventional farming and organic farming**. It uses control methods typical of the two production models. At the same time, there are several main differences between conventional and integrated farming. The focus here is on the agro technological measures, non-chemical methods, resistant varieties, balanced use of fertilizers and appropriate treatments which are used for restricting the harmful effects of diseases, pests and weeds during the vegetation of crops. IPM also implements bio agents – useful insects, mites and nematodes for biological control of main pests.

**Integrated production** is also a symbol of quality products produced by respecting the main principles of IPM, reducing applied pesticide and as a result spending less money on them. Unfortunately, we cannot present in this article data because farmers are still being trained about applying IPM for different agricultural crops. On its website, the BSFA still has not published a register of producers practicing integrated farming and the manuals for IPM are still not updated. As of today, there are submitted applications from farmers for implementing integrated production in their farms. Both types of production (integrated and organic) are directed towards the introduction of ecologically friendly practices with dependence on chemical methods for plant protection. The interrelation between agricultural producers involved in integrated production with those practicing organic farming is shown in the possibility for its realization as a **“conversion before the conversion”**. This means practicing integrated farming before the voluntary adherence to the so-called conversion period or a period of conversion of producers related to organic farming. This can be a wonderful opportunity for switching to another sustainable model of development and to organic farming in particular.

## 5. Development and challenges to the sustainable production models in agriculture (organic and integrated farming)

**Organic farming** is an important priority in the policy for development of agriculture in Bulgaria and one of the focuses of the CAP for the period 2014 - 2020. Encouraging farmers to converse or maintain organic farming contributes to:

- *the protection environment* – it preserves the agro ecosystems and the biodiversity and gives future generations the possibility to benefit from the preserved environment;
- *the development of sustainable and ecologically friendly agriculture;*
- *the production of healthy food products;*
- *The increase of employment rate in rural regions* because it creates more jobs compared with conventional farming.

As a result of the favourable conditions by the end of 2014 the total number of organic producers, food processors and traders, registered in the Ministry of Agriculture and Food, was 4 092. This number includes the subcontractors, too, who were 840. For more details see Table 1.

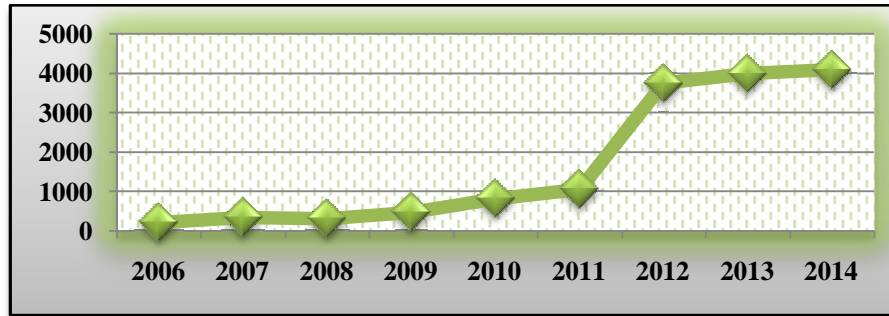
**Table1: Number of operators including subcontractors (producers, food processors and traders) involved in organic farming**

Years	2006	2007	2008	2009	2010	2011	2012	2013	2014
Number of оператори в биологичното производство	214	339	311	476	820	1 054	3 750	3 995	4 092

**Source:** MAF, according to according to data from the annual reports of control bodies of organic production (data courtesy to BAB)

Compared to 2009, when Bulgaria started applying the new EU legislation on organic farming, in 2014 the number of operators within the control system increased 8 times. Compared to 2006, the last year before Bulgaria's accession to the EU, the increase is more than nineteen times (see Figure 3).

**Figure 3: Increase of operators within the control system (2006 - 2014)**



**Source:** MAF, according to data from the annual reports of control bodies of organic production

All of the above mentioned reveals that despite the economic crisis over the last years the organic farming sector has been developing rapidly and has achieved considerable growth. This trend is clearly noticeable for the period after 2009 when organic farming became a truly significant, real economic sector. It is well known that organic farming is directed mainly towards the production of healthy, safety food products by preserving the elements of biological agricultural systems<sup>23</sup>. This is also typical of farms, which adhere not only to the common but also to specific principles of integrated management of pests and weeds and provide competitive products.

The areas, included in the control system of organic production, reached 74 351 ha in 2014, including the areas in conversion and those that have completed this process. There is an increase of 32% compared with the previous year (see table 2). If we compare the results for the last analyzed year, i.e. 2014, with the results for 2009, i.e. when organic farming is considered to have become a real economic sector in Bulgaria<sup>24</sup>, it is obvious that organically cultivated areas increased more than six times, i.e. from 11 789 ha to 74351 ha. This trend is shown in Figure 4.

The total amount of areas in the control system does not include wide crops such as mushrooms, herbs and forest fruits picked up in ecologically clean areas, which are not cultivated.

**Table2: Areas within the control system (organic farming)**

Areas	2009	2010	2011	2012	2013	2014
Total amount of cultivated areas (ha)	8 163	20 320	20 618	30 106	37 906	50 316
Permanent meadows and pastures(ha)	1 843	3 611	4 491	7 957	15 476	21 831
Uncultivated / fallow areas (ha)	1 783	1 716	1 513	2 315	2 905	2 204
All areas within the control system (in transition and post – transition state) (ha)	11 789	25 647	26 622	40 378	56 287	<b>74 351</b>
Wild crops*(ha)	401 425	546 195	543 655	472 700	678 025	694 251

**Source:** Bulgarian Association "Bioproducts"

<sup>23</sup>See further Nikolova, M. Osobenistipripravlenietonarastenievadnobiologichnostopanstvo (In English: Characteristics of the management of organic crop farms). Journal of Business Management, issue 4, p. 7-13, AI "Tsenov", Svishtov.

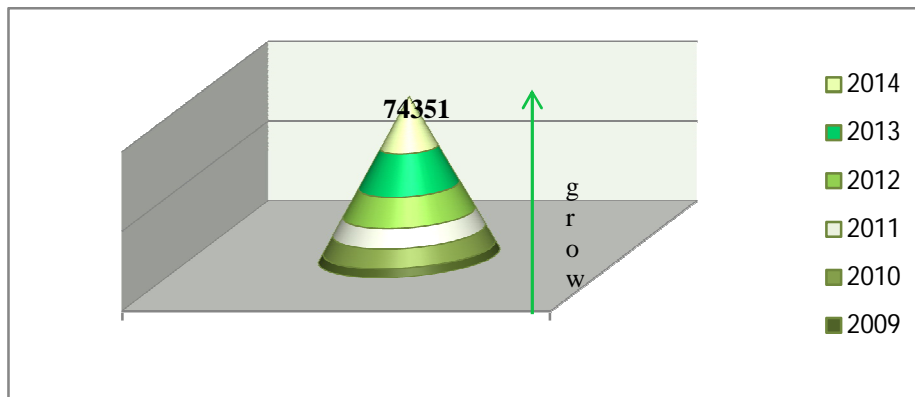
<sup>24</sup>Nikolova, M., (2013). Biologichnozemedelie – sastoyanie I potencialzarazvitie. (In English: Organic farming – current state and potential for development). Biblioteka "Obrazovanieinauka", issue 31, AI "Tsenov" Svishtov, p. 35.



\* Wild crops– mushrooms, herbs and forest fruits are picked up in certified, ecologically clean regions but the areas are not cultivated and are not included in the “All areas within the control system” entry.

Traditionally, the agricultural sector provides various goods, including ecosystem services. This is related to more intensive production methods, which include the use of mineral fertilizers, pesticides, etc., while the integrated production method involves reduced energy consumption and minimization of risks caused by pesticides by applying stable regulation mechanisms and appropriate tools.

**Figure 4: Increase of organically cultivated lands in ha (in conversion and having completed conversion)**



**Integrated farming (IF)** is one of the production models which can meet the expectations of both farmers and consumers. This innovative model guarantees the quality and safety of plant products as well as the protection and preservation of biodiversity. This is a *voluntary model* which relies on effective agricultural production practices that allow modern society to achieve the desired standards of quality, safety and environmental protection. It is necessary to increase the scope of application of this model so that consumers can make informed decisions when choosing different categories of products (i.e. produced by conventional, organic or integrated methods).

This model is appropriate for farmers who would like to produce quality food products, which meet high ecological and social standards. The model also applies innovative managerial practices for creating value, which is added to products. This increases the possibilities of attracting consumers of high quality, healthy products. *Bulgaria has just started to apply this model.* This is done during seminars and intensive information campaigns carried out by the Bulgarian Food Safety Agency (BFSA). Producers are expected to show interest in this new model in the future so that it can reveal its potential as an alternative to traditional farming practices. The possibility for applying the model also increases by the circumstance that even producers of conventional products are forced (starting from 2014) to obligatory follow the common principles of managing diseases, weeds and pests. In this way, traditional agriculture is becoming more ecologically oriented. It is also becoming easier for producers to start practicing integrated farming and continue with organic farming later.

As a rule, the challenges related to integrated production of plants and plant products are connected with the expected results of the application of Integrated Pest Management (IPM) and the adherence to its general and specific principles. One of the most important challenges is related to *the increasing number of organic farmers who have shifted to another sustainable production model succeeding the integrated production of plant products.* It is a fact that all agricultural activities should strive to achieve balance between protecting the environment, realizing economic effectiveness and meeting the requirements of the society. Sustainable agriculture is one of the main requirements of the civil society and it can be achieved through various production models. Integrated farming belongs here and this is indicative of the interest of farmers in the better application of the sustainable production standards. This is observed in other European countries while *in Bulgaria this sustainable model of agriculture is still not sufficiently spread.* The model of integrated farming is a sustainable development model, which is aimed at improving the profitability of agricultural activity by respecting high social and ecological indicators.

It could be an instrument for acquainting consumers with one new relation between the environment and production of food. Its dissemination should support and recognize this model of production. Despite the potential of integrated farming (IF) in Bulgaria, there is lack of interests on behalf of the agricultural sector, which is still not entirely familiar with the significance and potential contribution IF could for the development of a new model of sustainable agriculture.

**Organic farming** is another sustainable model for the development of modern agriculture and its development has been very dynamic over the last years in Bulgaria<sup>25, 26</sup>. The implementation of the activities envisaged under the Strategy for Sustainable Development of Agriculture in Bulgaria<sup>27</sup> implies that by 2020 organic farming will have gradually become of utmost importance for all agricultural subsectors. The challenges to the sector of organic farming correspond with the four main strategic goals of the Strategy for Development of Organic Farming in Bulgaria for the period 2013 - 2020<sup>28</sup>:

- √ Stabilizing and increasing the incomes of farmers by entering new markets of high quality, healthy food products;
- √ Preventing the process of abandoning land and depopulation of villages in rural regions;
- √ Protecting and recovering of natural resources through stabilization of ecosystems;
- √ Establishing a competitive and sustainable "Organic Farming" sector.

The development of organic farming in Bulgaria, in the long run, is aimed at continuing the trend of increasing the number of organic farmers and the amount of bio certified lands. The sector also plans to enter new markets where Bulgarian organic products can be sold; to process organic products and increase the number of certified organic livestock farms<sup>29</sup>. The challenges to the sector are related to the wide support it receives for its development, training of qualified staff, expansion of consulting services, and improvement of market conditions, development of both local economy and regional products through various forms of cooperation.

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<sup>25</sup>Nikolova, M., (2014). Trends and challenges in the development of organic agriculture in Bulgaria for the period 2014–2020. Problems of social and economic development of business. Collective monograph, Montreal, Canada, 229-232.

<sup>26</sup>Nikolova, M., (2013). Biologichno zemedelie – sastoyanie i potentsial za razvitiye. (In English: Organic farming – current state and potential for development). Biblioteka "Obrazovanie i nauka", issue 31, AI "Tsenov" Svishtov, p. 138-156.

<sup>27</sup>Stankov, I. and others. National Strategy for Sustainable Development of Agriculture in Bulgaria for the period 2014 – 2020), Sofia, p. 316-347.

<sup>28</sup>Apostolov, S. and others (2013). Strategic guidelines for the development of organic farming in Bulgaria. National Strategy for Sustainable Development of Agriculture in Bulgaria for the period 2014 – 2020, Sofia, p. 334-335.

<sup>29</sup>Nikolova, M., (2014). Trends and challenges in the development of organic agriculture in Bulgaria for the period 2014–2020. Problems of social and economic development of business. Collective monograph, Montreal, Canada, 234-235.

## Conclusions

Bulgaria has considerable potential and sufficient objective conditions (favourable climate and agricultural lands) in order to become a serious player on the market for crops and plant products produced through integrated farming methods. There are prerequisites and possibilities for the development of integrated farming but it is necessary to take measures to encourage the development of this production model as an alternative to ecologically friendly production with potential for further development.

Currently it is not possible to discuss consumption of products produced by integrated farming because farmers are not interested in engaging in such production. Consumers must also be informed about the advantages of such products and trained how to recognize them. The problems of integrated farming in Bulgaria are mainly of economic nature—Bulgarian producers, including the ones that are motivated to practice integrated farming, are entitled to a subsidy determined per hectare, but it is still low. Nevertheless, the potential for developing IF as a sustainable model is considerable. Integrated farming is a new production concept which is well-known in the European countries but it is not widely spread in our country. Integrated farming can be determined as a model for optimizing agricultural production by using information about more effective use of chemicals, energy saving, preservation of soil fertility and improvement of product quality. IF is an alternative production model for sustainable development of agriculture as an economic sector. It is also a possibility for using innovations in sustainable farming.

Integrated farming is a well – grounded model for encouraging the sustainable development of smaller farms (producing fruits and vegetables, for example). Its development is a difficult and slow process, which requires specific knowledge, motivation and support from governmental institutions. Unlike integrated farming, the organic production sector is already well established and its development is an indisputable priority in the development of Bulgarian agriculture for the period 2014 – 2020.

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