“Improvement of the effectiveness of organic farming in Ukraine”

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IMPROVEMENT OF THE EFFECTIVENESS OF ORGANIC FARMING IN UKRAINE

Abstract

To improve the efficiency of organic farming, it is important to improve the management of agricultural enterprises (agrarian management). The research was based on the hypothesis that adequate provision with and the use of fixed assets, as well as the concentration of production, play a decisive role in improving the efficiency of organic farming. This makes it possible to minimize the cost of conducting environmentally safe agro-technical and biocenotic measures, as well as reducing specific production costs.

To identify the reasons that hinder the development of organic farming in Ukraine we conducted a survey of managers of 80 agrarian enterprises from different regions specializing in the growing and export of grain (including organic). 65% of the surveyed managers indicated that the reason for non-implementation of organic production was an expected increase in production costs and a decrease in profitability compared to the traditional production methods. The respondents mentioned the lack of logistics infrastructure as the second obstacle according to the intensity of its impact – 25.9% of responses.

It has been established that in Ukraine, in comparison with other countries, there is a negative tendency for companies to save money on expanded reproduction and improvement of production technologies. The analysis shows that in most countries organic farming is conducted mainly by small farms, while in Ukraine big farms are certified. In the conditions of the shortage of credit resources necessary for updating the material and technical base, monopolization of the market of organic seeds and systematic growth of prices on resources, big farms are the ones to increase the concentration of organic farming and the means to achieve the necessary efficiency of production.

Keywords organic agriculture, profitability, conventional agriculture, agriculture management, operational management

JEL Classification Q16, Q18

INTRODUCTION

A promising area for strategic development of the agrarian sector is an introduction of effective methods of organic farming. The growing and selling of organic crops contributes to the formation of a raw material base for the production of organic food products with higher added value, expansion of range and increase of their competitiveness, introduction of the principles of environmentally responsible business, differentiation of markets, better management of price risks inherent in commodity markets (Michelsen, 2002). The ever-increasing demand on the domestic and foreign markets causes an increase in the volumes of growing, processing and marketing of organic agricultural products. In 2015 in Ukraine the retail sales of organic agricultural products by agrarian enterprises amounted to 20 million US dollars. This is 3.4 times more than in the previous year. At the same time, 70% of organic products produced in Ukraine are exported to the countries of the European Union and the CIS.

In spite of the favorable market conditions, the rate of development of the Ukrainian organic farming sector is much lower than potential opportunities. This can be explained by imperfect operational management, which is based on traditional agricultural production and somewhat outdated tools and information provision. They do not make it possible to timely and fully solve the problems of organic agriculture due to its organizational and technological peculiarities as well as strict requirements of international standards regarding the growing and transportation of the finished organic products, risk management. The principles of organic farming that conform to legislative restrictions for fulfilment of further non-production functions compared to the systems of conventional farming bring organic farmers particular problems that conventional farmers do not encounter much or at all (Moudry, 2012).

One of the reasons of inefficient management of decisions in the field of organic farming is also the "poorness" of information environment. Therefore, it is necessary to use the best scientific and practical experience as well as the expertise of expert and analytical agencies in Pest, Disease and Nutrient Management in Organic Agriculture. At the same time, it should be noted that, unfortunately, in Ukraine, the use of international approaches in organization of supply and sales, certification of organic products, personnel management do not provide the expected results. This is explained by the fact that in practice, the peculiarities of individual countries, the level of development of logistic infrastructure, the system of state regulation of agriculture and human resourcing are not taken into account. In addition, in making a decision on the management of profitable and ecologically oriented production, managers rely mainly on the results of comparison of the yield of crops in traditional and organic agriculture, as well as the economic expediency of such production taking into account price preferences (factors of the first order).

Of significant importance is the formation of an information base regarding organizational, technological, economic and managerial factors that have a significant impact on the efficiency of organic agriculture. The use of such databases will reveal unused reserves to reduce the costs and improve financial results of production, to timely and fully realize the basic functions of management, in particular, planning (especially strategic), organization, analysis and control.

That is why the goal of the study is to develop proposals for improving the efficiency of organic farming in Ukraine on the basis of the improved agrarian management.

1. METHODOLOGY OF RESEARCH

The object of the research is certified agricultural enterprises of Ukraine, which are engaged in the growing of organic products. The research was based on the hypothesis that adequate provision with and the use of fixed assets, as well as the concentration of production, play a decisive role in improving the efficiency of organic farming. The profitability of organic wheat growing was used as the main effective indicator of production efficiency. According to our assumption, the profitability of organic agriculture is increased by reducing direct material costs and increasing the concentration of production. The criterion of concentration is an increase in the share of agricultural land occupied by the growing of organic crops. This approach makes it possibleto minimize the cost of conducting ecologically safe agrotechnical and biocenotic measures (soil tillage, observance of scientifical methods of sowing, fertilization and nutrition, provision of acceptable methods of pest control, etc.). It will also help to reduce specific production costs. They include the costs of conducting a technical certification audit, introduction of a system of environmental management and risk management system into the production, storage and transportation of organic agricultural products, etc.

To achieve this goal, theoretical aspects of the effectiveness of organic production were studied by using a systematic approach. To prove the practical part of the proposed hypothesis, empirical methods are used – analysis, synthesis, observation, comparison and modeling. The need of comprehensive research and the lack of statistical in-

formation required the use of traditional statistical methods and sociological (questionnaires) surveys of the managers of agricultural enterprises.

2. LITERATURE REVIEW

The problems of organic farming development and improvement of the quality of management in the agrarian sector are actively discussed by experts, investors and specialists of agrarian enterprises. The subject of research is a wide range of economic, organizational, managerial, environmental, regulatory, technological, marketing and other issues that are often debatable. Thus, some scientists study environmental aspects and methodological principles of management in the use of organic and traditional methods of soil tillage (Gomiero, 2011; Sapogova, 2014).

The results of comparison of the influence of natural, economic and energy parameters of the aforementioned approaches to the organization of production process and management systems (ecological, product quality, financial) in agriculture have an important theoretical value (Piemental, 2005). Many scientific papers are devoted to solving the current problems in the organization and implementation of Pest, Disease and Nutrient Management in Organic Agriculture (Linker, 2009). The basic works in this area are the studies of Managing Soil Fertility in Organic Farming System (Watsons, 2002), Integration of Soil, Crop and Weed Management in Low-external-input Farming Systems (Liebman, 2000) and others.

The scientific research made it possible to obtain results on the issues of social significance, economic expediency, tasks and functions of operational management in organic farming, which is considerably more risky than the traditional one.

Some scientists point out that organizational and technological peculiarities of organic farming are responsible for the reduction of its economic efficiency in the short-term period due to the reduction of crop yields and the withdrawal of agricultural land from economic use in the transitional period from traditional to organic production (Philpott, 2015; Lockeretz, 1981; Lansink, 2002). The authors note the expediency of using specific management approaches. They are caused by the necessity of rapid technological modernization, training of personnel and substantiation of the strategy of financial support for the implementation of management decisions. According to the calculations and experiments of scientists, in order to cover the losses from the reduced yields in organic agriculture (compared to the yields with the use of mineral fertilizers), it is necessary that preferential prices of vegetables exceed the usual ones by 50.0-82.0% and of grain – by 33.9 – 91.0% (Dobrokhotov, 2014).

Another group of scientists believes that the transition to innovative, environmentally safe methods of soil tillage, although requiring the restructuring of the usual management system, is strategically one of the most promising directions for the development of agribusiness. According to Boulay (2010), those farmers who adopt organic agriculture are motivated by both financial and technical reasons. They convert because of financial considerations related to conventional farming, particularly, high input costs and ability to sell organic products at premium prices. Technical reasons, on the other hand, are related to the desire to secure sustainable existence and productivity of farms. Profitability (defined as the level of farm profits) must be distinguished from relative profitability of an organic farm, which refers to the changes in the relation of agricultural income of organic farms to the agricultural income of non-organic farms. Differences in prices, yields, production costs, direct payments and non-agricultural outputs are identified as the main determinants of the relative profitability of organic farms (Sanders, 2007).

The researchers conducted a meta-analysis of 44 studies representing 55 crops grown in 14 countries on five continents over 40 years, and discovered that organic farming was actually 22-35% more profitable than conventional agriculture. Organic foods, the study found, often include a price of "premium", or markup, of 29-32%. Only a 5-7% premium is needed to break even (Phillpot, 2015). The main reasons for higher profitability of organic systems are: higher market prices and premiums, lower production cost, combination of premiums and lower production cost (Nemes, 2009).

Table 1. The dynamics of the area of agricultural land, the number of producers and the volume of retail trade in organic products in Ukraine and in the countries of the world

Source: based on FIBL, 2015.

Country	Area, thousand ha			Area (share of total), %			Producers, unit			Retail sales, Mio $		
	2011	2015	Growth rates, %	2011	2015	+, –	2011	2015	Growth rates, %	2011	2015	Growth rates, %
Austria	562.3	553.6	–1.54	20.52	21.23	0.71	21983	20976	–4.6	1213.5	1213.5	–
China	1900.0	1809.9	–4.74	0.36	0.31	–0.05	7360	9990	35.7	901.9	5374.3	495.8
Den-mark	162.2	166.8	2.85	6.01	6.31	0.30	2677	2991	11.7	1004.8	1230.6	22.5
Germa-ny	1015.8	1088.8	7.19	6.07	6.51	0.44	22506	25078	11.4	7573.2	9831.5	29.8
Latvia	184.1	231.8	25.92	10.14	12.75	2.61	3484	3634	4.3	4.56	4.56	-
Nether-lands	47.2	49.3	4.38	2.45	2.55	0.10	1672	1472	–11.9	795.1	1222.3	53.7
Poland	809.4	580.7	–28.25	3.94	3.75	–0.19	23430	22277	–4.9	136.9	190.5	39.2
Switzer-land	116.2	137.2	18.11	11.05	13.08	2.03	5757	6244	8.5	1609.1	2487.0	0.54
Ukraine	270.3	410.6	51.88	0.65	0.99	0.34	155	210	35.5	5.8	20.0	243.1
United Kingdom	638.5	495.9	–22.33	3.72	2.88	–0.84	4650	3434	0.26	2170.5	2969.9	26.8
USA	2178.5	2029.3	–6.85	0.64	0.59	–0.05	12880	14871	15.5	21578.6	40810.9	89.1

Deserving attention are scientific studies devoted to one of the most important topics of management of organic farming – risk management. To date, scientists have investigated a wide range of problems, from methodological approaches to identifying risks of organic farming taking into account the natural, economic and social conditions of agro-production to the peculiarities of the practical use of traditional management methods (Hanson, 2007; (Ulanchuk, 2017). An in-depth analysis is contained in the study of the industry specific features of risk management in organic agriculture (Flaten, 2005; Amelina, 2014), which must be considered in management.

3. THE MAIN RESULTS OF THE STUDY

During the last decade the market for organic agricultural products and raw materials has become one of the most dynamic in the world. The consumer demand for organic products has grown by double-digits nearly every year since the 1990s. Most impressively, the sales of organic products have increased from $3.6 billion in 1997 to $43.3 billion in 2015. 2015 was a year of significant growth for the organic food industry. In fact, 2015 brought the industry's largest dollar gain ever, adding $ 4.2 billion in sales, up from the $3.9 billion recorded in 2014. To date, the industry has shown continuous and steady growth with a 10.8% growth rate in 2015, well above that of the overall food market at 3.3% (OTA, 2016). A significant growth in the capacity of the global and national markets for organic products as well as the profitability ensured by preferential prices, contribute to the intensification of investments of agricultural producers from different countries intoenvironmentalization and certification of agricultural land suitable for organic farming.

The production of organic agricultural products is actively growing in the world and in Ukraine. In 2015, the leading positions in the world in terms of the share of organic farming land in the total land fund of the agricultural sector was occupied by Austria – 21.23%, which is 0.71 percentage points more than in 2011, Switzerland – 13.08% (2.03 percentage points more than in 2011) and Latvia – 12.75% (2.61 percentage points more than in 2011). In spite of the activation of the state policy aimed at increasing the area of agricultural land using environmentally safe technologies, the share of land used in organic farming in Ukraine in 2015 does not exceed 1% (Table 1).

In 2011–2015, Ukraine was one of the three leading countries in terms of the growth of the area of certified agricultural land used i n organic farming. In particular, the increase of this indicator in Ukraine was 51.87%, in Latvia – 25.92%

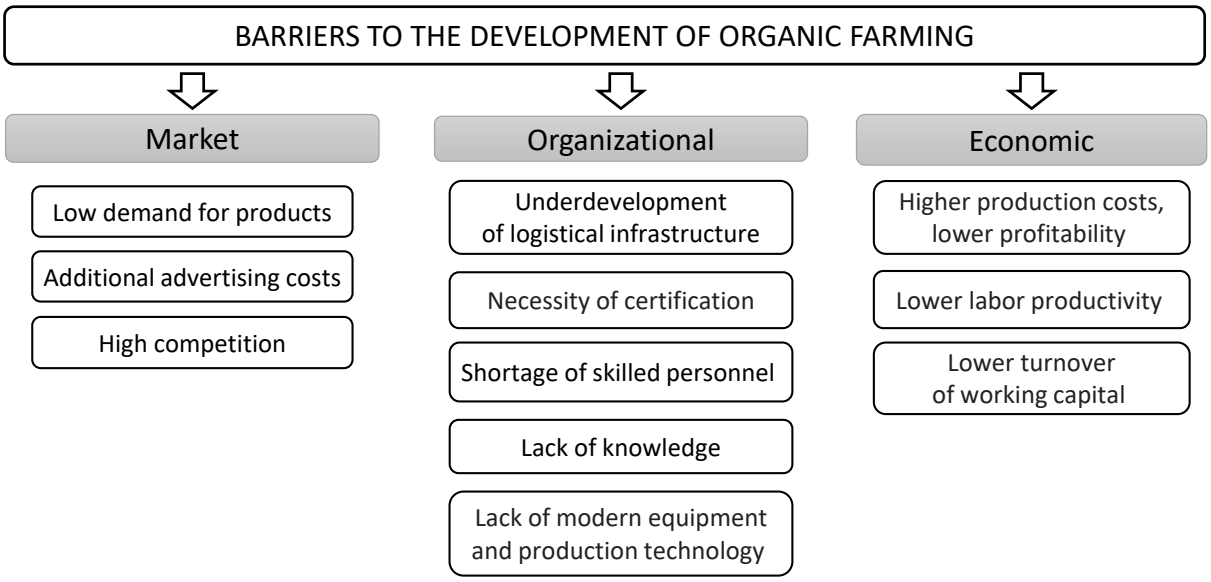

Figure 1. Restraints to the development of organic farming in Ukraine

and in Switzerland – 18.11%. In all the analyzed countries there was also a significant increase in the volumes of retail sales of organic products. According to the rate of growth, the first place was occupied by China – almost by 495.6%, while the second place – by Ukraine – 243.1%.

In Ukraine, in the recent years there has also been an increase in the number of farms that have certified the production, processing and marketing of organic agricultural products and have been able to use the label "organic product". Thus, during the period 2011–2016 the number of organic operators in Ukraine increased from 31 to 210 or by 6.8 times. At the same time, having favorable natural and climatic conditions and considerable reserves of environmentally clean lands, in comparison with other countries, Ukraine has an extremely low entrepreneurial activity in the organic farming sector. In 2015 in Ukraine only 210 enterprises were certified for compliance with organic production standards, while in Latvia – 3634, Poland – 22277, Germany – 25074.

To identify the reasons that restrain the development of organic farming in Ukraine, we conducted a survey of managers of 80 domestic agricultural enterprises from different regions of Ukraine, which specialize in the growing and export of grain (including organic). The respondents were given a list of the main problems identified by us in the organic farming sector of Ukraine. On the basis of the "coverage of objects of the economic process" they are united by us in the following main groups: market, organizational and economic (Figure 1).

Therefore, market barriers include low demand, additional advertising costs and high competition. Organizational barriers include: lack of logistical infrastructure, necessity of certification, shortages of skilled personnel and knowledge, lack of modern equipment for soil tillage and other technological processes. The subgroup of economic barriers includes reduced profitability, productivity and turnover of working capital. At the same time, each respondent had to select only one answer from the proposed list of restraints. The results of the survey are shown in Table 2.

65% of the surveyed managers believe that the reason of not implementing organic production was an expected increase in production costs and lower profitability compared with traditional methods of production. The respondents mentioned the lack of logistical infrastructure as the second obstacle according to the intensity of its impact – 25.9% of all responses. In the organic production agrarian producers are prohibited from using chemical means of processing the finished agricultural products. That is why the problem of preserving the quality of products during the long-term transportation and storage associated with addi-

Table 2. Results of the survey of heads of agrarian enterprises in Ukraine regarding the main obstacles of the realization of the principles of organic farming, 2017

Obstacle	Number of responses, persons	Share of responses, %
Higher production costs and lower profitability compared to the traditional production methods	52	65.0
Underdevelopment of logistical infrastructure	22	25.9
Necessity of certification	18	16.3
Lack of knowledge	4	5.0
Shortage of skilled personnel	2	2.5
Lack of modern equipment and production technology	2	2.5
Lower labor productivity	–	–
Lower turnover of working capital	–	–
Low demand for products	–	–
Additional advertising costs	–	–
High competition	–	–
Total	80	100.0

tional costs is becoming increasingly relevant. In addition, 16.3% of respondents noted the problem of additional certification costs. The respondents also indicated lack of knowledge – 5%, shortage of skilled personnel and lack of modern equipment and production technology – 2.5% each respectively. It should be noted that none of the surveyed managers, in contrast to the researchers, indicated the problems concerning the reduction of labor productivity and turnover of working capital, lack of demand and high competition. This demonstrates that agrarian producers consider the market of organic products to be promising and low-competitive.

Traditionally, the profitability of organic crop production is ensured by preferential prices, which are 30-90% higher than the prices for inorganic products. However, in the conditions of increased competition on the organic products market, increased pressure from the segments of "traditional" products, which every year become "more environmentally friendly" and due to ecologization of the technological process, in the long run the factor of preferential pricing loses its advantages. Therefore, effective growing of organic agricultural products by enterprises is based mainly on efficient cost management and lower costs of finished products. Depending on the object, the costs of organic farming are divided into the costs of the transition (stabilization) period and operating expenses.

In accordance with the Standards of the International Accredited Certification Bodies for Organic Production and Processing (equivalent of the European Union Standard), transition period is the time required for a complex of agro-chemical and land reclamation measures to eliminate the negative effects of the prior land use and to improve or stabilize the quality of soil (Standard, 2015).

According to the data of the State Statistics Service of Ukraine, in 2016 agrarian enterprises received on average 64.6 US dollars in profits per 1 hectare of spring-planted wheat crops. With this profitability, the losses of an agrarian enterprise from the withdrawal of 20 hectares of agricultural land for the growing of organic spring-planted wheat in the transition period is estimated at 2.6 thousand dollars. The transfer to the principles of organic crop production requires additional capital investments in order to improve the quality of soils during the stabilization period. According to the experts, on average, the cost of works in this period is 3.0 thousand US dollars/ha. Therefore, in organic farming the total costs of the stabilization period are almost 11 thousand US dollars per 1 hectare.

The total costs of agriculture production include: operating/variable costs: all production practices including planting, pest and weed management, harvesting, etc.; cash overhead: land rental, property taxes, etc; and non-cash costs: depreciation and opportunity costs for equipment, irrigations systems, tools and buildings (Nemes, 2009).

The cost structure of growing 1 ton of organic wheat differs significantly from the cost structure in the traditional agriculture. In particular, in organic farming the costs of labor, fuel and lu-

Table 3. The costs of growing 1 ton of winter wheat in organic and traditional agriculture in the US, Poland and Ukraine in 2015, US dollars

Source: according to the data of theUnited States Department of Agriculture, Poland Department of Agriculture and statistical reporting of certified enterprises of Ukraine.

Cost item	USA			Poland			Ukraine		
	Conventional	Organic	+, –	Conventional	Organic	+, –	Conventional	Organic	+, –
Operating costs:									
Seed	13.93	21.89	7.96	27.90	45.80	17.90	31.80	43.20	11.40
Fertilizer	43.54	13.12	–30.42	61.55	10.30	–51.25	43.50	12.50	–31.00
Chemicals	14.24	1.44	–12.80	18.50	2.50	–16.00	21.50	2.57	–18.93
Custom operations	9.41	8.61	–0.80	12.50	22.80	10.30	17.80	32.40	14.60
Fuel, lube and electricity	12.19	15.25	3.06	18.90	38.90	20.00	26.80	47.90	21.10
Repairs	19.07	20.97	1.90	18.60	20.50	1.90	15.30	16.20	0.90
Purchased irrigation water and straw baling	0.52	1.81	1.29	0.15	0.18	0.03	0.01	0.01	0.00
Interest on operating inputs	0.16	0.12	–0.04	–	–	–	–	–	0.00
Total, operating costs	113.06	83.21	–29.85	158.10	140.98	–17.12	156.7	154.78	–1.92
Allocated overhead:									
Hired labor	1.95	3.92	1.97	5.60	15,60	10.00	2.60	20.40	17.80
Opportunity cost of unpaid labor	15.85	19.27	3.42	–	–	–	–	–	–
Capital recovery of machinery and equipment	70.31	71.77	1.46	12.40	22.30	9.90	2.40	3.70	1.30
Opportunity cost of land (rental rate)	46.13	52.49	6.36	–	–	–	–	–	0.00
Taxes and insurance	5.80	6.69	0.89	2.10	2.40	0.30	1.40	1.40	0.00
General farm overhead	10.12	13.24	3.12	–	–	–	–	–	0.00
Total, allocated overhead	150.16	167.38	17.22	20.10	40.30	20.20	6.40	25.50	19.10
Total, costs listed	263.22	250.59	12.63	178.20	181.28	3.08	163.10	180.28	17.18

bricants grow in connection with an increase in the volume of manual labor and technological works. At the same time, there is a saving of costs on the purchase of mineral fertilizers and chemical means of plant protection. The cost structure of organic and traditional agriculture in different countries is shown in Table 3.

In 2015, in the analyzed countries the cost of growing of 1 ton of organic products was the highest in the United States – $ 250.59, which is 27.6% higher than in Poland and 25.5% higher than in Ukraine. This is related to the fact that in the United States the cost of growing crops includes such costs as opportunity cost of unpaid labor, general farm overhead and others. In addition, Poland and Ukraine have significantly lower costs onthe major improvement of fixed assets, taxes and insurance. It should be noted that in the analyzed countries only in the United States the cost of growing oforganic wheat is lower than the wheat obtained from the farms with traditional tillage technology. The overall deviation is 12.63 US dollars or 4.2%. A critical review of the costs of individual items has shown that cost savings are achieved through the savings on fertilizers (30.41 US dollars) and the means of plant protection (12.8 US dollars). In Poland, the cost of organic products is 3.08 US dollars or 1.7% higher than the cost of usual products. Unlike the United States, in Poland, the reduction of fertilizer and plant protection costs are not covered by the growth of other costs, such as the cost of seeds, energy and wages.

Among the above mentioned countries, Ukraine has the lowest cost of 1 ton of organic wheat – 180.28 US dollars, which is 17.18 US dollars or 10.5% higher than the cost of wheat grown with the use of traditional technologies. With a more detailed analysis of the structure of expenditures we can make a conclusion about the growth of direct material costs. In 2015, in the cost structure of growing 1 ton of organic winter wheat the largest share was the cost of energy resources and fuel – 26.57% of total operational costs, the cost of planting materials – 23.96%, the services of external organizations – 18.0%,

Table 4. The area of agricultural land occupied by organic agriculture, calculated for one certified enterprise in the world, 2015, ha

Source: based on FIBL, 2015.

Country	Area per one producer		
	2011	2015	Growth rates, %
Austria	25.58	26.39	3.17
China	258.15	181.17	–29.82
Denmark	60.58	55.76	–7.96
Germany	45.14	43.42	–3.81
Latvia	52.84	63.79	20.72
Netherlands	28.23	33.47	18.56
Poland	34.55	26.07	24.54
Switzerland	20.18	21.98	8.92
Ukraine	1744.00	1955.00	12.10
United Kingdom	137.32	144.42	5.17
USA	169.14	136.46	–19.32

wages – 11.3%. In the cost structure of 1 ton of organic products in comparison with the traditional ones there is a significant growth of such items as "Costs of energy resources, fuel and equipment". This is caused by an increase in the number and duration of technological processes in organic farming. The growth of the other two types of costs is explained by the fact that in organic farming enterprises purchase special agricultural machinery, which has a limited impact on the physical parameters of the soil, but is rather expensive in servicing. The high book value of fixed assets (due to short-term use) also causes high costs of the item "Depreciation". Because of this, in Ukraine, in comparison with other countries, there is a negative tendency for enterprises to save money on expanded reproduction and improvement of production technology – capital investments into fixed assets.

The high share of costs of the item "Seeds and Planting Material" is related to the fact that in accordance with the requirements of organic crop production only the use of organic seeds and planting material is allowed. Currently, only three certified domestic companies (one of them specializing in soybean seeds), as well as foreign suppliers are operating on the market of organic seeds in Ukraine. Due to the predominance of imports and significant market monopolization, the prices of organic seeds are determined by suppliers, who introduce a margin to cover foreign exchange risks. Considering the fact that in the cost structure of organic plant production the value of seeds exceeds 20%, high prices of planting material will have a negative leaffecton the economic efficiency of organic plant growing.

Ukraine is significantly different from other countries according to the square of agricultural land occupied by organic farming per 1 certified enterprise (Table 4).

In countries with significant land fund like China, the United Kingdom and the United States, a certified farm uses on average more than 100 hectares of land. In 2015, in these countries one agrarian enterprise specializing in organic farming accounted for 181.17, 144.42 and 136.46 hectares of land, respectively. In other countries, the average value of this indicator ranged from 26.39 hectares in Austria to 65.76 hectares in Denmark. In Ukraine, an agrarian enterprise certified to meet the requirements of international organic standards, cultivated almost 2 thousand hectares. The conducted analysis shows that mainly small farms are envolved in organic farming, while in Ukraine big farms are certified. This is explained by the influence of the following factors:

1. Big agricultural enterprises have initial investment resources for conducting preliminary-agrotechnological measures, restoration of ecological safety and biological activity of the soil, establishment of schemes of transportation and sales of the finished products on the domestic and foreign markets. Due to the lack of active state financial support, high interests on credit resources and the hortage of work-

Table 5. Dynamics of certified agricultural and sand farms growing organic products in Ukraine, 2002–2015

Source: calculated according to the Federation of Organic Movement of Ukraine.

Year	Number of farms		Area of farmland		Area of farmland per one farm	
	units	Till 2002, %	Thousand ha.	Till 2002, %	Thousand ha.	Till 2002, %
2002	31	100.0	164.5	100.0	5.3	100.0
2003	69	222.6	239.5	145.6	3.5	65.5
2004	70	225.8	240.0	145.9	3.4	64.7
2005	72	232.3	242.0	147.1	3.4	63.4
2006	80	258.1	242.0	147.1	3.0	57.1
2007	92	296.8	249.9	151.9	2.7	51.3
2008	118	380.6	270.0	164.1	2.3	43.2
2009	121	390.3	270.2	164.3	2.2	42.1
2010	142	458.1	270.2	164.3	1.9	35.9
2011	155	500.0	270.3	164.3	1.7	32.9
2012	164	529.0	272.9	165.9	1.7	31.4
2013	175	564.5	393.4	239.1	2.2	42.4
2014	184	593.5	400.8	243.6	2.2	41.5
2015	210	677.4	410.6	249.6	2.0	37.7

ing capital, agrarian enterprises focus on traditional farming practices that do not require the use of special techniques, knowledge and management methods.

2. Due to the expansion of the product range on the existing agricultural markets as well as the "capture" of the emerging and developing markets, large agricultural enterprises are strengthening their competitive positions, implementing the "green" development strategy. Considering the lack of developed marketing infrastructure, smaller agrarian enterprises focus on local markets: local buyers, for example, eco-restaurants, eco-boutiques, eco-hotels and the generalpopulation.

3. Smaller farms are not certified. Certification for the compliance with organic farming standards is mostly carried out by domestic agricultural enterprises specializing in the growing of traditional export-oriented agricultural raw materials. In Ukraine, in the structure of certified organic areas cereal crops occupy 48.1%, oilseeds – 16.2, legumes – 4.6, fruits – 0.6, grapes – 0.1, vegetables – 2.0, other crops – 28.5% (Karpenko, 2017).

Unfortunately, in the recent years in Ukraine there is a steady tendency to reduce the concentration of environmentally-oriented agricultural production. Despite the fact that in 2002–2015 the area of agricultural lands under organic crops increased from 164.5 to 393.4 thousand hectares or almost by 2.4 times, the area of agricultural land occupied by organic farming calculated for one farm decreased by more than half (Table 5).

Figure 2 shows a decrease in the area of agriculturall and occupied in organic production perone enterprise, on average, by 0.195 ha pes year.

The "splintering" of organic agricultural producers is caused by reorientation of the average agricultural producers on the markets of cereals and soy, the formation of a narrow specialization of small agrarian enterprises and family farms, which have occupied certain niches on the market.

Reorientation of average agricultural producers on the markets of grain and soybean is caused by the steadily growing demand for them on the international markets. Another factor is a decline in demand for organic products on the domestic market due to the sharp deterioration in the solvency of the population.

The formation of a narrow specialization of small agrarian enterprises and family farms is explainedby the lack of financial resources for tech-

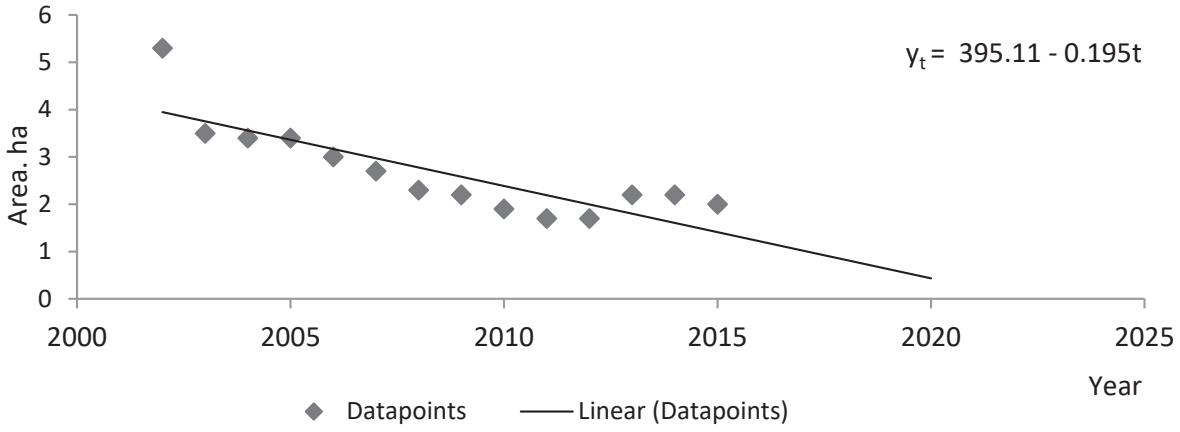

Figure 2. Dynamics of the area of agricultural and occupied by organic farming calculated per one enterprise in Ukraine, 2000–2015

nical modernization, training of personnel and promotion of their products on the markets. These producers have already occupied certain niches on the market (honey, berries, fruits and products of their processing) and produce products involving only family members or seasonal workers. The tillage of a small area makes it possible to independently carry out technological processes due to the absence of funds for special agricultural machinery. Organic farmers tend to spend more on labor – 7-13% more according to the study. They use of pest control methods, for example, introducing a predator insect to get rid of a pest species, instead of pesticides applied en masse. But farmers offset those costs by skipping the expense of synthetic fertilizers and pesticides (Shanker, 2009).

The dependence of the profitability of growing of organic wheat on the efficiency of use of the main production factors, according to agricultural enterprises, is presented in Table 6.

The results of the conducted correlation-regression analysis show that there is a clear relation between the profitability of organic wheat growing, which characterizes the effectiveness of organic farming (effective indicator) by the return on fixed assets, the share of agricultural land occupied in organic farming and the cost of energy per 10 tonnes of organic wheat. An increase in the return on fixed assets by 1 US dollar will increase profitability by 0.8%, an increase in the share of agricultural land occupied by organic farming by 1% will increase the profitability of organic agriculture by 0.4%, while reduction of energy costs by 1 US dollar will raise the level of profitability by 0,01% at a fixed value of other factors included in the model.

Table 6. Dependence of the profitability of growing of organic wheat on the efficiency of use of the main production factors, 2010–2015, US dollars

Indicator	Groups of enterprises according to profitability, %			Average (total)	The ratio of indicators of group III to group I, %
	I	II	III		
	< 20	20-60	≥ 60		
Number of enterprises, units	15	23	22	60	146.7
The share of farmland in organic crop production, %	8.2	12.5	18.8	13.17	+10.6 percentage points
The cost of 1 ton of organic wheat	177.1	148.6	145.6	154.6	87.3
Productivity of labor	94.7	103.2	109.6	103.4	109.2
The cost of biological assets per 100 hectares of agricultural land	98.89	115.0	146.8	120.2	121.5
Energy costs per 1 ton of organic wheat	48.24	39.85	38.58	42.22	80.0
Return on fixed assets	8.6	9.8	12.6	10.3	146.5

CONCLUSION

Organic farming is one of the priorities of the agrarian complex of Ukraine. The basic preconditions for the stable expansion of agricultural land in organic farming are the growing demand for organic products on the international and domestic markets, availability of large areas of non-cultivated lands, intensification of the national agricultural policy in promoting the transition to environmentally safe methods of soil tillage. For agricultural producers the introduction of the principles of organic farming contributes to the expansion of markets and their differentiation, improvement of the ecological state of lands, the transition to the organizational and production basis of sustainable development.

The development of organic farming in Ukraine is characterized by an increase in the number of enterprises that have certified agricultural lands for organic crop production. However, at the same time, there is a tendency of reduction of such lands per one agricultural enterprise. This demonstrates the transition to the principles of organic farming not only for large-scale producers, but also for the average ones.

Further development of organic farming in Ukraine is slowed by the use of outdated management methods due to the lack of efficient, initial information data, the results of analytical research on organizational and economic factors that are extremely dynamic and have a significant impact on production efficiency. The priority goal of agrarian management is to find reserves for improving the efficiency of organic farming in Ukraine by reducing the total production costs, intensifying the use of basic productive resources, primarily, of agricultural machinery and skilled personnel. Considering that the technique used in organic agriculture corresponds to the latest technological developments, the increase in the efficiency of its use is related to the concentration of organic production.

Implementation of the principles of organic farming requires that agricultural enterprises adjust the management of production, marketing, organizational and management systems. In order to ensure profitability and increase economic efficiency of organic farming it is necessary to ensure a gradual concentration of production, which will make it possible to ensure effective crop rotation, reduce direct material costs of major technological processes, increase energy efficiency and return on fixed assets.

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