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FEATURES OF DOING BLUEBERRY BUSINESS IN UKRAINE

The article presents the results of the research of fruit and berry market in Ukraine. The main aspects of its functioning are determined. The list of material required for blueberry planting, technological equipment for drip irrigation system, plant protection system is offered. The international production and sale experience of fruit and berry products is presented. Recommendations for determining promising areas of market development of the fruit and berry products in Ukraine are formulated. The need for labor resources, costs in the project farm is given. Packing schemes of berries are suggested. The SWOT-analysis was carried out and the strengths and weaknesses of competitors in the blueberry trade were identified. The efficiency of berry business by farmers, personal farms is based on the concentration and intensification of agricultural production. In this regard, determining the priority of economic efficiency of blueberry production has a particular importance, which determines the relevance of the chosen topic.

Keywords: blueberries, economic efficiency, exports, imports, sales, fruit and berry products.

Янишин Я. С., Марків Г. В., Содома Р. І., Когут М. В. ЕКОНОМІЧНА ЕФЕКТИВНІСТЬ ВИРОЩУВАННЯ ЛОХИНИ В СІЛЬСЬКОМУ ГОСПОДАРСТВІ УКРАЇНИ

У статті наведено результати досліджень ринку плодово-ягідної продукції України. Визначено основні аспекти його функціонування. Запропоновано перелік матеріалу, який потрібен для висаджування лохини, технологічного обладнання для системи капельного зрошування, система захисту насаджень. Представлено міжнародний досвід виробництва та реалізації плодово-ягідної продукції. У сучасних умовах світовим трендом здорового способу життя є споживання ягідної продукції. Обсяги виробництва ягід у країнах-членах ЄС та країнах, що є найбільшими постачальниками ринку Європи, щорічно зростають у середньому на 6% за останні п'ять років. Україна має шанс стати основним виробником і постачальником продукції традиційних і найбільш затребуваних ягідних культур, насамперед на європейський ринок. Іншими перспективними експортними напрямками є виробництво органічної ягідної продукції, вирощування однієї з нішевих ягідних культур – лохини. Сформульовано рекомендації з визначення перспективних напрямів розвитку ринку плодово-ягідної продукції в Україні. Подано потребу в трудових ресурсах, витрати у проєктному фермерському господарстві, схеми пакування ягід. Проведено світ-аналіз та визначено сильні і слабкі сторони конкурентів у торгівлі лохиною. Сьогодні лохина займає третє місце у структурі ягідних плантацій України, поступаючись лише смородині та садовій полуниці. На частку лохини в Україні припадає 20% всіх площ, зайнятих плантаціями ягідних культур, керованих професіоналами. Ефективність ведення ягідного бізнесу фермерськими, особистими селянськими господарствами засноване на концентрації та інтенсифікації сільськогосподарського виробництва. Водночас успіху досягає те підприємство, яке створить вищу споживчу якість за нижчою ціною та задовольнить споживача краще, ніж конкуренти. Аналізуючи потенційних конкурентів, доцільно виділити уже давно напрацьовану мережу збуту товару, розроблену стратегію маркетингу. Основна мета вирощування лохини – досягнення максимального прибутку, оскільки лохина є культурою високорентабельною. Фінансова стратегія підприємства полягає в забезпеченні максимально швидкої окупності інвестиційного проєкту. Конкурентний потенціал підприємства є системою виробничих, фінансових та організаційних можливостей у забезпеченні ефективного збуту продукції. Бізнес починає

СОЦІАЛЬНО-ЕКОНОМІЧНІ ПРОБЛЕМИ СУЧАСНОГО ПЕРІОДУ УКРАЇНИ

приносити високий прибуток, оскільки ягоди лохини дуже затребувані на нинішньому ринку. Тому визначення пріоритету економічної ефективності виробництва лохини набуває особливого значення, що визначає актуальність обраної теми.

Ключові слова: лохина, економічна ефективність, експорт, імпорт, продаж, фруктовো-ягідна продукція.

Problem statement. In modern conditions, the global trend of a healthy lifestyle is the consumption of berry products. Berry production in the EU and the largest suppliers on the European market has been growing annually by an average of 6% over the last 5 years. Ukraine has a chance to become a key producer and supplier of traditional and most popular berry crops, primarily to the European market. The issue of blueberry costs-cultivation-profit in modern conditions remains relevant.

Analysis of recent research. Issues of theory and practice efficiency of fruit and berry crops cultivation by agricultural enterprises were dealt with by both domestic and foreign scientists, practitioners: O. Tregubov (2006), P. Vavryshchuk (2009), K. Pliszka (2002), K. Smolarz (2003).

Problems related to the adaptation of agricultural enterprises to market conditions and the formation of the export potential of Ukrainian enterprises were studied by P. Sabluk et al. (2001) [7], V. Ulanchuk et al. (2011) [6], V. Gubenko (2013) [2]. Economic prospects for growing berries, including blueberries were studied by Yu. Kernasyuk (2015) [3].

The above studies are very important, but they do not provide sufficient answers to the challenges facing producers of berry crops, in particular blueberries (garden blueberries) in the current environment.

The paper purpose is to develop a detailed investment project with the calculation of cost-effectiveness

assessment, the implementation of which will allow the contractor to achieve commercial success, and for the investor to make a profit. At the same time, it will create opportunities to increase Ukrainian blueberry exports to the European market in the future. This is especially important in the context of a deep and comprehensive free trade area between Ukraine and the EU.

Major research findings. Of all the fruit and vegetable segment, the blueberry (blueberry) market is developing the fastest. Forecasts for further development remain positive, as demand for these berries is growing rapidly in many countries, and it is not only the fresh market, but also the segment of frozen berries. In addition, blueberries have become a global berry – this berry is grown in different countries and on different continents.

Also, blueberries can be sold throughout the year, and logistics capabilities allow you to deliver blueberries to anywhere in the world. According to the International Blueberry Organization (IBO), blueberry production is growing worldwide. Over the past 20 years, the production area under it has increased from 25,000 hectares in 1995 to almost 140,000 hectares in 2018, while the production of berries has increased more than 20 times, reaching 655,000 tons in 2018.

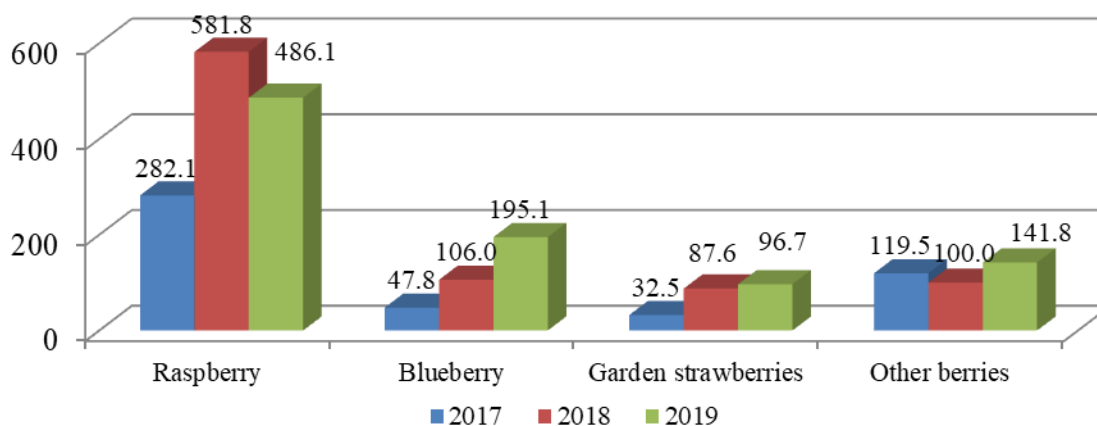


Fig. 1. Dynamics of areas under major berry crops in Ukraine, 2017-2019

Source: own calculations.

And this trend continues. This is due to the emergence of new regions of blueberry production. Spain is the leader on the European continent with a berries production about 30,000 tons. In particular, Poland ranks second with 16,000 tons. For comparison: in Ukraine this figure is at 2000-2500 tons. Over the past 20 years, the area under blueberries in the world increased from 25,000 hectares to 140,000 hectares and now is continuing to grow rapidly.

Ukrainian producers are not only actively investing in expanding the area under blueberries, they are also improving the quality of berries. For example, Ukrainian producers are introducing frost protection systems,

investing in research into varieties of cultivated plants that would be most suitable for growing on certain soils in the local climate.

Demand and supply in the market are not yet balanced, demand continues to grow rapidly, so growers do not forecast a surplus of berries on the market in the next three years.

At the same time, blueberry production in Ukraine has a strong export potential. According to the analytical platform East-fruit, only from 2015 to 2017, blueberry exports increased six times (to 1900 tons), and in 2018 exceeded 2000 tons. The largest importers of Ukrainian berries are Belarus, the Netherlands and the United Kingdom.

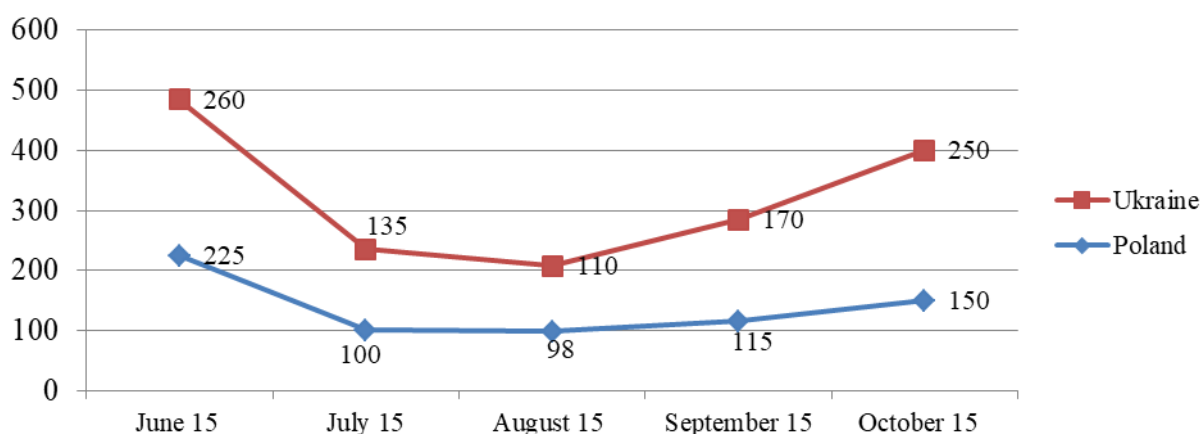


Fig. 2. Prices for blueberries 2019, UAH / kg

Source: own calculations.

Thus, blueberry exports to Belarus in 2017 amounted to 739 tons, which is 49% more than in 2016. The Netherlands' second largest trading partner imported 720 tons of blueberries in 2017. The United Kingdom took third place with a figure of 419 tons. Although it should be noted that exports to the UK in 2017 compared to the 2016 season increased by 300%. At the same time, the average purchase price was UAH 120-150 / kg.

On average, in 2017, retail prices in Europe ranged from 15-20 euros per kilogram of conditioned fresh blueberries. Frozen blueberries are sold cheaper – from 6 to 9 euros / kg.

If we talk about wholesale prices, the main European market, where it was possible to sell the most profitable blueberries in 2017, was the United Kingdom. Prices for packaged, calibrated and ready-to-export blueberries ranged from 6 to 8 euros / kg. In neighboring Poland, wholesale prices ranged from 4 to 6 euros / kg.

As for domestic prices in Ukraine, the first wholesale batches of blueberries from Ukrainian farms in the domestic market in 2017 were estimated at 230-260 UAH / kg (7.6-8.6 EUR / kg), and in the middle of the season the price dropped to 170-200 UAH / kg (5.6-6.6 EUR / kg).

The price range for imported blueberries in Ukraine was much wider, due to the heterogeneous quality of products: low-quality blueberries were offered at 150-160 UAH / kg (4.9-5.3 EUR / kg), and better quality berries – at 200-230 UAH / kg (6.6-7.6 EUR / kg). Consumer prices for blueberries depend on several factors, such as the quality, origin and size of the package.

According to EastFruit analysts, in 2020, in addition to the coronavirus, the most important reason for the decline in blueberry prices was the very active expansion of its production in many countries. Given the high demand for blueberries in Ukraine and relatively low purchase prices from European exporters, it is still more profitable to sell blueberries in the domestic market, and farms are not yet able to form consistently large batches of blueberries for export.

This, in turn, necessitates and confirms the prospects of doing business in the industrial cultivation of blueberries.

We consider that it is advisable to create an enterprise in the form of a farm. The advantages of choosing this legal form are a simplified system of taxation and the opportunity to participate in government programs to support agricultural producers. It will also facilitate the signing of contracts for the sale of products, both in processing plants and in retail chains.

When an enterprise is created that specializes in growing this type of berry, you should pay special attention to the choice of location. The area should be well lit, with no stagnation of cold air and preferably not southern exposure (where the growing season usually begins a little earlier), where nothing has been grown for a long time and which has time to rest from fertilizers.

One-year (rooted cuttings), two-year or three-year-old seedlings can be used as planting material. The most technological and economically acceptable are biennial plants.

Table 1

Recommended list of material required for planting blueberries (area 5 ha)

Material name	Number	Price, UAH	Amount, thousand UAH
1. Seedlings	16500	50	825.0
2. Peat (substrate)	5000	230	1150.0
3. Agrofabric 50 UA (100v)	724	1038	751.5
Total			2726.5

Source: own calculations.

Blueberries are quite demanding to irrigation conditions. Drip irrigation systems are commonly used, in which case it is possible to feed and apply pesticides.

We propose to introduce a system of the so-called «smart field» or as they call it «one click berry». «In this way, everything will be arranged in such a way that it is possible to monitor and adjust the processes on the plantation with the help of a tablet, 180 humidity sensors

located throughout the plantation at different depths and transmit information to the main unit further through solenoid valves. The system will decide which rows should be watered and which should not, which row lacks acidity. This system works on the «Arduino» platform, the software for the program is publicly available on various forums on the Internet. The components of the program can be obtained separately in China and then assembled on site.

Table 2

Recommended list of process equipment for drip irrigation system

Name of technological equipment	Price, thousand UAH	Quantity, items
Drip irrigation system at 1000 m	2400.0	72
Pump station Calpeda BS2V2NM80 / 250D	600.0	1
V-10000 water storage tanks	86.0	3
Humidity sensors	46.8	180
Motor pump Energomash	4.9	1
Additional materials	70.0	-
Total	3207.0	x

Source: own calculations.

When grown in agrobiocenosis, blueberries will be affected by pests and diseases. Taking into account the experience of growing this crop in other countries, it can

be argued that in Ukraine there is a wide range of registered plant protection products that can be used on this crop if necessary.

Table 3

Recommended system of plant protection

Plants protecting tools	Costs per 1 ha, l	Costs per 1 ha, UAH	Costs for the entire area, thousand UAH
The first treatment			
Topas	0.5	650	3.3
The second treatment			
Topas	0.5	650	3.3
Total			6.6

Source: own calculations.

Blueberry plants require a relatively small amount of nutrients and do not tolerate high concentrations of fertilizers.

The best type of nitrogen fertilizer is ammonium sulfate. This fertilizer reduces the reaction of the soil solution (especially relevant on carbonate soils, where after the introduction of sulfur to lower the pH over time, the reaction may be somewhat equalized).

Phosphorus on a fruit-bearing plantation contributes an average of 60-80 kg / ha d.r. phosphorus per year depending on the results of soil analysis and rapid analysis of the leaf sample.

Potassium is usually needed after full fruiting 50-100 kg / ha d.r. potassium per season. As with most other

berry crops, potassium chloride and other chlorine-containing forms of potassium fertilizers should be avoided.

Trace elements are best applied by foliar fertilization, because the low soil pH that needs to be maintained blocks the plant's access to the soil reserves of most of them.

It is better to analyze the leaf sample several times a season to timely adjust the balance of nutrients.

Blueberry shoots thicken over time and form more and more lateral fruit twigs. At such thickening the size of berries decreases and their quality worsens. Therefore, such branches should be removed. Usually when pruning remove every sixth branch (if the bush has 12 branches, then cut the 2 oldest).

Table 4

Recommended list of technological equipment and inventory to ensure comprehensive mechanization of blueberry cultivation

Name of technological equipment	Quantity, items	Price, thousand UAH
MTZ – 82 tractor	1	550.0
Trailer 2PTS –4	3	336.0
Rotary mower Motor Sich KRN – 2C	1	8.5
Tractor sprayer 200	2	10.7
Garden shears	5	1.3
Total		906.5

Source: own calculations.

From the moment of planting blueberries up to 4 years, sanitary pruning is recommended, removal of shoots of sick, weak, or mechanically damaged or frozen.

Rejuvenating pruning is used five years after planting, reducing or cutting old stems. The best time to prune blueberries is late winter and early spring.

Berries are harvested from the beginning of July to September (depending on the variety).

The berries acquire a deep dark blue color 34 days before full ripeness.

The collection is carried out every 7-10 days.

It is recommended to harvest in the morning, after the dew has evaporated. The products are immediately cooled and stored at a temperature of 0 ... + 2 ° C and a relative humidity of 90-95%. Under these conditions, the berries can be stored for up to 14 days without loss of quality.

With the use of some varieties and the appropriate scheme of planting, you can mechanize the harvesting process.

The first ripe berries are harvested by hand and sold on the market of fresh produce, and then, when mass ripening – use a combine.

Table 5

The need for labor resources

№	Position	Number	Payment, UAH
1.	Leader-manager	1	10000
2.	Accountant	1	9000
3.	Tractor driver	1	6800
4.	Assistant tractor driver	1	5000
5.	Watcher	4	4800
Total payroll per month		8	50000
Additional workers are required at harvest time			
6.	Berry pickers	30	240000

Source: own calculations.

The wage fund is 600.0 thousand UAH permanent employees; 240.0 thousand UAH these are seasonal workers at harvest time.

In order to determine the value of this business plan (project), the amount that must be invested to ensure that the company began to operate smoothly, we use the balance sheet calculation method (table 6).

Table 6

Planned costs in the project farm

Investments	
Costs	Amount of expenses, thousand UAH
Seedlings	825.0
Peat (substrate)	1150.0
Agrofabric 50 UA (100v)	751.5
Drip irrigation system	3207.0
MTZ – 82 tractor	550.0
Trailer 2PTS –4	336.0
Mower rotor Motor Sich KRN – 2C	8.5
Tractor sprayer 200	10.7
Garden shears	1.3
The cost of work performed	500.0
Total	7340.0

Source: own calculations.

The following table shows the expected costs during the first year of operation of the projected farm.

Table 7

Current costs in the projected farm in the first year of operation

№	Cost item	Amount of expenses, thousand UAH
1	Premises for rent (refrigerated warehouses)	170.0
2	Depreciation of equipment	135.9
3	Advertising	-
4	Fertilizer	80.0
5	Plants protecting tools	6.6
6	Wages	840.0
7	Social contributions	184.8
8	Fuels and lubricants	150.0
9	Land lease	75.2
11	Administrative expenses	50.0
Total		1692.5

Source: own calculations.

The following table shows the expected financial results, taking into account that for the 2nd, 3rd, 4th, 5th and 6th years will be incurred only the costs of caring for blueberry bushes, harvesting by employees and product

certification. It is expected that the sale of blueberries will be carried out at the following price: 1st and 2nd year ≈ 200 UAH / kg, 3rd year ≈ 220 UAH / kg, 4th year ≈ 240 UAH / kg, 5th and 6 year ≈ 250 UAH / kg.

Table 8

Expected revenue from the sale of blueberries

Years	Number of seedlings, pcs	Yield of 1 sapling, kg	Price, UAH / kg	Revenue, thousand UAH
1 year from planting	16500	-	200	-
2 years from planting	16500	0.5	200	1650.0
3 years from planting	16500	1.5	220	5445.0
4 years from planting	16500	2.0	240	7920.0
5 years from planting	16500	3.0	250	12370.0
6 years from planting	16500	4.0	250	16500.0

Source: own calculations.

СОЦІАЛЬНО-ЕКОНОМІЧНІ ПРОБЛЕМИ СУЧАСНОГО ПЕРІОДУ УКРАЇНИ

The first year of harvest will not allow us to make a profit. Thus, capital investments for the establishment of a blueberry farm will be covered for the 4th year of the

farm, when the total income received during the three years (2nd to 4th) of the farm will exceed the initial investment in 9032.5 thousand UAH.

Table 9

Technical and economic indicators of growing blueberries

№	Name of indicators	Unit of measure	The value of the indicator
1	The total area	ha	5.1
	incl. under plantings	ha	5.0
2	Land use ratio	hwt	0.98
3	Capital investment per 1 hectare	thousand UAH	1806.5
4	Yield	hwt/ha	87.29
5	Gross collection	hwt	436.45
6	Production costs per 1 hectare	thousand UAH	218.30
7	Production cost of 1 quintal of product	UAH	2500.86
8	The average selling price of 1 quintal of product	UAH	22660.0
9	Product cost, total	thousand UAH	9889.96
10	The cost of production, total	thousand UAH	1091.50
11	Profit, total	thousand UAH	8798.46
12	Profit per 1 ha of plantations	thousand UAH	1759.69
13	Labor costs per 1 ha of plantations	man-year	876.0
14	Labor costs to create 1 quintal of product	man-year	10.0
15	The level of mechanization of production processes to create plantations	%	21.1
16	Profitability	%	161.22
17	Coefficient of economic efficiency		0.60
18	Payback period of investments	years	5
19	Duration of planting	years	3
20	The period of entry of plantations into commercial fruiting	from the year of planting	3
21	Optimal term of use of plantings	years	30

Source: own calculations.

Since the main purpose of any business is to maximize profits, the newly created berry farm, of course, is no exception. In terms of market relations, the farm chooses a pricing mechanism «taking into account the level of current prices» because we have several tasks: maximize profits; strengthen communication with our customers; find new customers, new sales channels (because it is planned to increase sown areas); reaching the leading positions in the region in this field (as well as increasing the competitiveness of our product).

An important issue in the marketing plan should be to determine the range of potential buyers who will ensure

guaranteed sales of the harvest [9]. Appropriate advertising and contract work must be carried out in order to set up a product sales system. To sell the harvest of the second and third year, you can use advertising and marketing via the Internet, including online stores, even social networks. It is also advisable to sell blueberries on a «sale from the field» system, the price per kilogram will be lower, but transport costs will be reduced.

SWOT-analysis is an effective method for studying opportunities and threats in one's activity [10, p. 235]. The assessment is based on the SWOT-analysis, which is shown in Fig. 3.

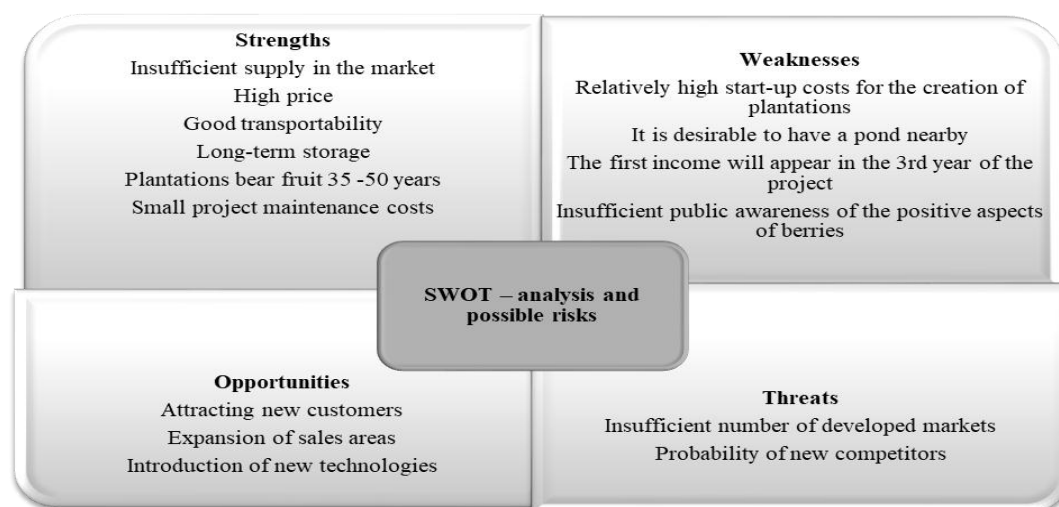


Fig. 3. SWOT-analysis. Assessment of strengths and weaknesses in relation to competitors

Source: own research.

The study of the company's prospects is aimed at revealing the resources of strengths and weaknesses.

Consumers of the harvest of the 4th and subsequent periods can be large supermarkets, wholesale markets, food markets, shops, catering outlets, health care facilities and others.

In addition, sales planning must be carried out taking into account the frequency with which the harvest will take place during the year – from July to September inclusive.

Conclusions. Production of berries for export is one of the most marginal and promising types of agricultural business in Ukraine. The export component in the gross production of berries is about 14-16%, but over the years it is growing. The main exporters of Ukrainian berry products are Poland, Belarus, EU countries and Great Britain. The structure of exports is dominated by frozen berries. Blueberries, raspberries, wild and organic berries have greater advantages for export.

It is expected that in the next 10 years Ukraine will enter the top ten countries producing blueberries in Europe. Therefore, it can be argued that the business of growing this berry will be very promising, because the profitability of berry sales can be 70.5%, i.e. each dollar of income will bring the company \$ 0.75 net profit.

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