

5. The state of the horticultural industry in Ukraine and the role of state support in increasing its competitiveness

The current level of development of society has sharpened the attention of consumers the need for complete and quality nutrition, which is impossible without the use of horticultural products. Fruits, berries and their products industrial processing contribute to the normal functioning of the human body, have unique therapeutic and anti-radiation properties. However, their consumption per capita in Ukraine is steadily declining, and in 2021 it was only 57 kg, which is 30.5% less than the scientifically sound rational consumption rate.

At the same time, it should be noted that Ukraine owns favorable natural and climatic conditions for growing most fruit and berry crops not only for their own consumption, but also for the formation of export potential.

Important key indicators of the competitiveness of Ukraine's horticultural industry are both the expansion of its export potential and growth of the level and dynamics of development of the domestic market of fruits and berries, increase provision of the population of the country with fruit and berry products of proper quality. During the period of so-called "perestroika" and the first years of transformation of the Ukrainian economy (from 1985 to 1999) the volume of horticultural production decreased by more than five times. In addition, the decline of the industry in the 1990s was underscored by the expansion of imports fruits, even those that in the natural and climatic conditions of Ukraine should be more productive than in other countries, technological backwardness, lack of proper infrastructure (storage, processing), without which the horticultural industry cannot develop.

Despite the annual fluctuations in the volume of gross production of fruits and berries, in recent years there has been a positive growth trend in production and industry development. Capacity building of the horticultural industry is underway several main factors, including: stable demand for berries and fruits in the domestic market during the year against the background of unmet needs of the domestic bandage domestic products; increasing the number of people providing benefits of healthy

eating and increase your own demand for fruits and berries; due to rising prices and demand for horticultural products in both Ukraine and the world, horticultural products are becoming more attractive for production for domestic producers and new investors; programs of state financial support of the industry, operating for about 20 years.

The modern global fruit and berry market is becoming more competitive, segmented, demanding on the quality and safety of fruits, needs new products, varieties and plant species. An important factor that determines the trends and prospects for the development of the horticultural industry is its development in cooperation with related industries and types of activity: processing, finishing, packaging, storage, certification, logistics, etc. The horticultural industry is quite capital-intensive, the return on investment in the garden is distant in time for years. For existing in the current period of rates of credit resources and conditions of their receipt for agricultural producers further increase of potential of branch of gardening without participation of the state impossible.

Recently, in some sectors of the horticultural industry there has been business activity in the establishment of new plantations, the introduction of modern varieties and technologies of cultivation and storage. fruit processing and berries, due to the growing demand for quality fruit and berry products in the domestic market and the attractiveness and affordability of its exports to European markets and remote markets. However, at the current level of development, the horticultural industry cannot be defined as competitive, despite the fact that Ukraine has a number of advantages over other countries for the production of fruits, berries, grapes.

A comparison of indicators of production and consumption of fruits and berries by the population of Ukraine indicates that, despite the fact that both indicators are growing, consumption predominates, and therefore produced insufficiently fruit and berry products. Improper the level of domestic production both by structure and by region. Production fruits and berries per person in 2021 was 54.3 kg (Table 1), including grain – 30.6 kg, stone fruit - 12.3, nuts – 2.7, berries - 3.1 kg. This level is 1.6 times lower than the norm. At the same time, the needs of the population of Ukraine by regions are met unevenly.

Table 1

Production and consumption of fruits and berries in Ukraine per capita

Years	Production, fruits, berries per person per year, kg	Consumption, fruits, berries per person per year, kg
2010	38	48
2015	50	51
2016	47	50
2017	48	53
2018	61	58
2019	50	59
2020	48	59
2021	54	57

Source: Compiled for [84]

During the years of transformation of the Ukrainian economy, the horticultural industry has experienced significant changes. The area under orchards decreased by more than three times, at the same time the yield of fruit and berry crops increased more than 2.5 times (Table 2). In 2021 the level of production of fruits and berries in Ukraine reached 2,235.1 thousand tons, which is more than in 2000 almost 1.5 times. However, this is still 23% lower than in 1990. Their main volumes are received in households, in particular in 2021 – 79.2%, or 1,770.9 thousand tons. And the share of fruits grown by them was 83.1%, berries - 89.1%. Among the fruits of grain crops in 2019 were produced mainly apples - 87.2% (1,153.4 thousand tons), from stone fruit-cherry - 31.0% (167.5 thousand tons), from nuts – Walnuts - 100.0% (126.1 thousand tons), berries - strawberries - 45.8% (62.6 thousand tons) [83, p. 17]

Horticulture in Ukraine did not develop according to the type of farming, as it happened in European countries. In the postwar period, after the deep destruction, a significant number of state farms and specialized horticultural farms were established, in which funds state was restored in 1950, 594 thousand hectares of gardens. In subsequent years, there was a significant expansion of areas under orchards and berries. For 20 years (1950-1970) theirs the area increased by 280% and reached 1.3 million hectares, and the yield - by 26%.

Table 2

Dynamics of areas, gross harvest, yield of fruit and berry crops
in Ukraine by categories of the producers

Years	All categories of producers	Including:			
		agricultural enterprises	to all categories of producers,%	households	to all categories of producers,%
Area of fruit-bearing plantations, thousand hectares					
1990	679,8	336,4	49,5	343,4	50,5
2000	378,0	243,5	64,4	134,5	35,6
2005	265,5	124,8	47,0	140,6	53,0
2010	223,2	75,1	33,6	148,1	66,4
2115	206,0	58,2	28,3	147,8	71,7
2016	196,7	51,0	25,9	145,7	74,1
2017	198,5	51,2	25,8	147,3	74,2
2018	198,5	50,7	25,5	147,8	74,5
2019	194,0	46,2	23,8	147,8	76,2
2020	191,0	43,5	22,8	147,5	77,2
2021	190,5	42,7	22,4	147,8	77,5
Gross harvest, thousand tons					
1990	2901,7	1347,1	46,4	1554,6	53,6
2000	1452,6	264,1	18,2	1188,5	81,8
2005	1689,9	200,1	11,8	1489,8	88,2
2010	1746,5	286,8	16,4	1459,7	83,6
2115	2152,8	391,1	18,2	1733,2	80,5
2016	2007,4	370,5	18,5	1636,8	81,5
2017	2048,0	333,8	16,3	1714,3	83,7
2018	2566,2	551,5	21,5	2014,7	78,5
2019	2125,2	350,7	16,5	1774,5	83,5
2020	2023,9	340,5	16,8	1683,4	83,2
2021	2235,1	464,2	20,8	1770,9	79,2
Yield, t/ha					
1990	4,2	3,9	93,0	4,5	104,7
2000	3,8	1,1	28,9	8,8	231,6
2005	6,4	1,6	25,1	10,6	166,2
2010	7,8	3,8	48,8	9,9	126,0
2115	10,5	7,1	67,8	11,8	112,7
2016	10,2	7,3	71,1	11,2	110,1
2017	10,3	6,5	62,9	11,6	112,9
2018	12,9	10,8	83,7	13,6	105,7
2019	10,9	7,5	68,6	12,0	110,0
2020	10,6	7,8	73,6	11,4	107,5
2021	11,7	10,8	9,2	12,0	102,6

Source: Compiled for [84]

Crop capacity orchards in collective and state farms did not exceed 25–30 c/ha, and in homesteads of peasants - 1.5–2 times higher (40–50 c/ha) [77, p. 5]. During

1971–1995 there was a dismantling of orchards in non-specialized farms, and the area of fruit crops decreased to 0.7 million hectares, as a result, the yield of orchards increased and amounted to 40-60 kg/ha, gross annual harvest of fruits - 1.4-3.5 million tons, mostly due to the intensification of fruit growing in specialized and research farms, as well as the development of collective and home gardening [77, p. 5].

Against the background of world trends in horticulture, when new intensive ones were introduced technologies, new varieties, Ukrainian horticulture remained at the same level as those resources that have gone to farms since Soviet times. Under such conditions, the industry without significant investments, replacement of technologies, availability of proper infrastructure could not be developed at the expense of own sources.

Innovation is impossible without the investment policy of the state, which plays a crucial role in ensuring the sustainable development of horticulture. It determines the structure of investments, directions, real sources, implements effective and rational measures for the implementation of national regional and local socio (economic and technological programs, reproduces the processes in the industry at the macro and microeconomic levels. In the late 90's of the twentieth century horticulture had special sources of public finance support, which were: adopted by the Verkhovna Rada of Ukraine on 09.04.1999, the Law “On fees for the development of viticulture, horticulture and hop growing” and the Resolution of the Cabinet of Ministers of Ukraine from 15.07.05, №587 “On the collection and use of funds for development viticulture, horticulture and hop growing”.

The payers of the fee are business entities, regardless of ownership and subordination, which sell alcoholic beverages and beer in the wholesale and retail trade network. The collection rate was 1% of the proceeds from the sale of these products. Starting from August 1, 2011, taxpayers pay a fee of 1.5% of the object of taxation, as provided by the Law of Ukraine of 07.07.2011, №3609-VI, “On Amendments to the Tax Code of Ukraine and some other legislative acts of Ukraine on improving certain provisions of the Tax Code of Ukraine”, which amended the Law of Ukraine " On Development Tax viticulture, horticulture and hop growing”.

Later it became obvious that the brake factors of the revival of the horticultural industry were the lack of modern infrastructure for storage and finishing of marketable horticultural products, lack of investment in modernization of the industry in accordance with modern horticultural technologies. The implementation of such measures was not complicated not only due to lack of funds, but also significant parcelling of small producers private sector. A significant obstacle to the further development of the industry was the underdevelopment of storage and modern processing infrastructure, the objects of which can be effective only due to the effect of scale.

In 2009, the mechanisms of state financial support were expanded to include the list those to be reimbursed included the cost of building refrigerators with a regulated gas environment with a capacity of 500 tons for the storage of table grapes and home-grown fruit. Increase in the collection rate to 1.5% made it possible to increase the level of reimbursement of these costs, as well as to provide the industry funds for the modernization of production of enterprises that grow fruits and berries.

However, only large horticultural farms were able to use such assistance, production volumes which allow to use storages effectively with a volume of more than 500 tons. In addition, there should be other infrastructure structures around each repository, the construction of which requires considerable own funds and is not available gardener-farmer or sole proprietor.

However, the state financial support of the industry for the creation of horticultural infrastructure continued, the list of areas of support was significantly expanded. Such, in 2012 to be reimbursable, defined the costs of:

- construction of water storage pools to ensure uninterrupted water supply of drip irrigation networks for the purpose of timely watering of vineyards and orchards;
- uprooting of unproductive perennials (after planting in the reporting year of new gardens and vineyards on a similar area);
- acquisition of mechanisms and equipment (including imported production, which is not produced in Ukraine) for technological operations in viticulture,

horticulture and hop growing and new equipment for freeze-drying of fruits and fruit processing lines;

- construction by nurseries of laboratory complexes for production of virus-free planting material;

- modernization of refrigeration and gas storage modes in reconstructed refrigerators with a capacity of 500 tons and construction of quick-freezing chambers fruits and berries by producers of such products [82].

State financial support for the horticultural industry in Ukraine was provided only by distributing funds from the special fund. The effect of the use of special funds grew every year. Sales revenues were received for UAH 1 of funds spent in 2010 fruits ₴5.46, which is 18 times more than in 2000. In 2012, the share of gross fees fruits in agricultural enterprises, formed at the expense of state support, amounted to 90.5% (327 thousand tons). In addition, the yield of planted gardens was 6.3 times higher (7.9 t/ha) against existing plantations, and this in conditions when not all crops have entered into commercial fruiting, in particular seed 2009–2012 plantings and grain 2010–2012 [83, p. 21]. Thus, growth rates indicate that state financial support for the industry for 12 years has created the preconditions not only to overcome the decline, but also to begin its modernization in accordance with the requirements of the open market economy.

In the future during 2013-2016 after the repeal of this law on support of the industry special fund to support the industry ceased to exist, the state began to allocate less, which affected the recovery of the industry.

In 2017, a decision was made to further support the horticultural industry within the framework of the program 2801350 “State support for the development of hop growing, establishment of young orchards, vineyards and berries and supervision over them”. It was the purpose for the use of budget funds has been changed, namely budget funds were provided to business entities in the industry to partially reimburse costs by directions:

- 1) carrying out works on planting, care for them before fruiting;
- 2) purchase of planting material of fruit and berry crops, grapes and hops;

3) construction of refrigerators with regulated gas environment for storage of table grapes and fruits of own production, as well as purchase lines of commodity processing of fruits;

4) construction by nurseries of laboratory complexes for production of virus-free planting material;

5) acquisition of mechanisms and equipment for technological operations in viticulture, horticulture and hop growing and new equipment for sublimation fruit drying [82].

In 2019, funding for this program was focused on only two directions:

- purchase of planting material of fruit and berry crops, grapes and hops;
- construction of refrigerators with regulated gas environment and facilities with freezing of fruit and berry products, purchase of fruit processing lines, equipment for freeze-drying of fruit.

For these purposes, it was planned to allocate funds from the state budget to the general budget the amount of UAH 400 million.

Table 3 present data on the use of funds for the development of viticulture, horticulture and hop growing in Ukraine and Vinnytsia region in particular, which is one of the most developed regions of industrial horticulture in the country in 2019.

Table 3

Information on receiving financial support from agribusiness entities in Ukraine in 2019 from the general fund

Region	2801350 "State support for the development of hop growing, establishment of young orchards, vineyards and berries and care for them"					
	Total		Reimbursement of costs for the purchase of planting material		Refrigerators	
	Thousands UAH	%	Thousands UAH	%	Thousands UAH	%
Vinnytsia region	19916	5.0	8884.8	3.2	11031.3	9.2
Total in Ukraine	397878.9	100	277878.9	100	120000.0	100

Source: Developed by the author

The study of public funding shows that the budget program "Establishment and supervision of young orchards, vineyards and berries" at the expense of 1.5% of the

fee for the development of viticulture, horticulture and hop-growing, paid from the sale in the wholesale and retail network of alcoholic beverages and beer to a special account of the State Treasury, in 2019 5.0% (19916 thousand UAH) of the total amount of reimbursed by the state expenditures in the horticultural industry of Ukraine (397878.9 thousand) were sent to horticultural enterprises of Vinnytsia region, including the costs of purchasing planting material were reimbursed in the specified region (3.2% - 8884.8 thousand UAH) from the total amount of reimbursed by the state costs for the purchase of seedlings in Ukraine (277878.9 thousand) and refrigerators - 9.2% (11031.3 thousand) of the total volume of state support for fruit growing (120000.0 thousand)

Stable, timely and effective state support for horticulture is not only the key to innovation enterprises of the industry, but also the economic growth of the latter, the development of the infrastructure of the fruit market and raising the level welfare in the countryside.

Modern equipment purchased with state support Vinnytsia enterprises provide the opportunity to store fruits and berries in a regulated gaseous medium (RGM).

The main feature of the repository is the use of the most advanced technology storage of apples in the regulated atmosphere of the DRA (dynamically regulated atmosphere). Refrigerators and RGM equipment are controlled by a single industrial computer - My Fruit Premium control system manufactured by Van Amerongen. A comprehensive management program allows use equipment organically, improve storage quality while reducing energy consumption. You can control the storage of the product in 112 refrigerators at the same time.

Storage is based on advanced ACR (breath control system) technology, which helps to reduce the “drying” of the product during storage to a minimum. An important condition: the absolute tightness of refrigeration chambers, to ensure which in this storage for the first time used the technology of continuous sealing of sandwich joints panels of the Dutch company RibbStyle.

Tightness is also ensured through the use of Salco gas-tight doors. Their uniqueness is in the use of a patented pneumatic seal. The refrigerators have special air

coolers of the "fruit" series Thermofin, which provide the necessary humidity without the use of humidifiers.

Refrigeration facilities and new warehouses for storage of products allow the above-mentioned horticultural enterprises to sell products in the spring, when the price is highest, and to make extra profits and hand over fruit storages in rent to those companies that do not have such equipment, provide the market with fresh fruits and berries all year round, enter international markets, export their products, and these are already higher prices and, accordingly, profits of the company, which will pay taxes to the state budget.

In 2019, it was envisaged that farmers who build refrigeration complexes and processing facilities, as well as producers of organic berries and fruits could apply for subventions from the state. Previously expected to allocate UAH 400 million, of which half - for the construction of refrigerators with RGM and quick-freezing chambers, the purchase of sorting lines and sublimation, as well as the purchase of processing equipment for natural juices and fruit (berry wines from their own raw materials and another UAH 200 million - for reimbursement the cost of planting material and care for young perennials for organic production.

Obstacles to obtaining compensation are the use of plant varieties that are not included in the Register, and the establishment of orchards and berries without proper project documentation. Cooperatives of various forms were given preference in financial assistance for the construction of refrigerators and the purchase of processing equipment.

As a result of state support for the industry, horticultural farms have succeeded significantly increase the area of young orchards and berries. During 2017-2019 13.6 thousand hectares of fruit and berry plantations were planted. In addition, as a result of accession in commodity fruiting of young orchards there is an increase in the production of fruits and berries in agricultural enterprises over the past ten years - by 22.3% (in 2019 - 350.7 thousand tons). However, according to horticulture expert I.A. Salo, reproduction of perennial plantations is still insufficient, as the area disposal of old plantations is almost twice as large [83, p. 21–22].

In 2020, the amount of state support remained at the same level, however more attention was also paid to the establishment of plantations and the creation of infrastructure for storage and completion:

- seedlings, wallpaper, drip irrigation;
- new construction and reconstruction of refrigerators, primary processing shops, freezing facilities;
- purchase of lines for commodity processing of fruits and berries, automated lines for drying fruits, berries and hops, lines for processing home-grown fruits, berries and technical varieties of grapes, machinery and equipment for technological operations.

Reimbursement of the cost of planting was at the level of 80% of the cost, the rest - at the level of 30%.

Further state financial support for the industry will help strengthen its potential, improving the economic efficiency of all resources industry and, accordingly, its competitiveness.

Thus, the Resolution of the Cabinet of Ministers of Ukraine of March 10, 2021 № 185 "On Amendments to the Procedure for Using Funds provided in the state budget for the development of viticulture, horticulture and hop growing" defines the mechanism for using funds provided in the state budget under the program ", Which are used for state support of producers of fruits, berries, grapes and hops.

Budget funds are directed to the state support of producers of fruits, berries, grapes and hops in order to stimulate the increase of plantation areas, production of fruit and berry products, grapes and hops, increase their storage and processing capacity.

Budget funds shall be provided to economic entities that establish fruit and berry plantations, vineyards and hop gardens on a non-refundable basis within the budget allocations provided for in the state budget for the current year to reimburse expenses (excluding value added tax) incurred in the period from October 1 of the previous year to September 30 of the current year on:

1) purchase of planting material of fruit and berry crops, grapes and hops (hereinafter - planting material), - in the amount of up to 80 percent of the costs incurred (after planting or repair of plantations);

2) carrying out works and purchasing materials for the construction of wallpaper and installation of drip irrigation systems (hereinafter - the work) - in the amount of up to 50 percent of the costs incurred (after the completion of installation work);

3) purchase of machinery, mechanisms and equipment (including foreign production not produced in Ukraine) for technological operations in viticulture, horticulture and hop growing (hereinafter - machinery, machinery and equipment) in accordance with the list of such machinery, machinery and equipment approved by the Ministry of Economy, - up to 30 percent of their value.

Reimbursement of costs for planting material may not exceed the standards within which the partial reimbursement of their value, approved by the Ministry of Economy.

Business entities - producers of fruits, berries, grapes and hops, which carry out agricultural activities for processing, processing and / or preservation of fruits, berries, grapes and hops, budget funds are provided on a non-refundable basis within the budget allocations provided by the state budget for the current year, to compensate up to 50 percent of the value (excluding value added tax):

1) new construction and reconstruction of refrigerators for storage of fruits, berries, table varieties of grapes and hops of own production, shops of primary processing of grapes, fruits and berries of own production, facilities for freezing of fruit and berry products (hereinafter - objects);

2) purchase of lines for commodity processing of fruits and berries, automated lines for drying fruits, berries and hops of own production, lines for processing fruits, berries and technical varieties of grapes of own production into juices, purees, wine materials (hereinafter - lines) after commissioning.

The cost of facilities put into operation from October 1 of the previous year to September 30 of the current year and / or the cost of lines purchased in the same period is subject to compensation.

Budget funds shall be used to repay accounts payable registered with the Treasury for expenditures provided for state support of producers of fruits, berries, grapes and hops, in the prescribed manner. [81]

Recovery in some sectors of the horticulture, in our opinion, is possible on based on the cooperation of various participants on the model of public-private partnership. Such experience is available in European countries.

In order to ensure the implementation of Article 1 of the Decree of the President of Ukraine of March 19, 2021 №103 “On the National Investment Fund” the Cabinet of Ministers of Ukraine established the state enterprise “National Investment Fund of Ukraine” (Resolution of the Cabinet of Ministers of Ukraine of March 31, 2021, №295). According to the approved charter, the subject of activity of the National Investment Fund is: attraction and concentration of financial resources for the implementation of investment projects; financing and implementation of priority investment projects; investment attraction; preparation of investment and other projects; management of property in accordance with the law; formation of investment funds, participation in investment funds; participation in joint activities; participation in socially significant projects.

In order to develop selection in horticulture, Mazur K. propose to create a program of private sector investment in research farms, including the Institute of Horticulture of the National Academy of Agrarian Sciences of Ukraine to attract additional funds for breeding new varieties of legumes for further industrial apple growing in Ukraine and export of seedlings abroad.

Mazur K. propose with the assistance of the National Investment Fund of Ukraine to attract private investment in the development of breeding work at research stations of the Institute of Horticulture NAAS. The investor investing in the investment of selection works will have the right, together with the IH NAAS , to use the relevant patents and obtain seedlings of bone crops adapted to the requirements of each potential investor (Figure 1).

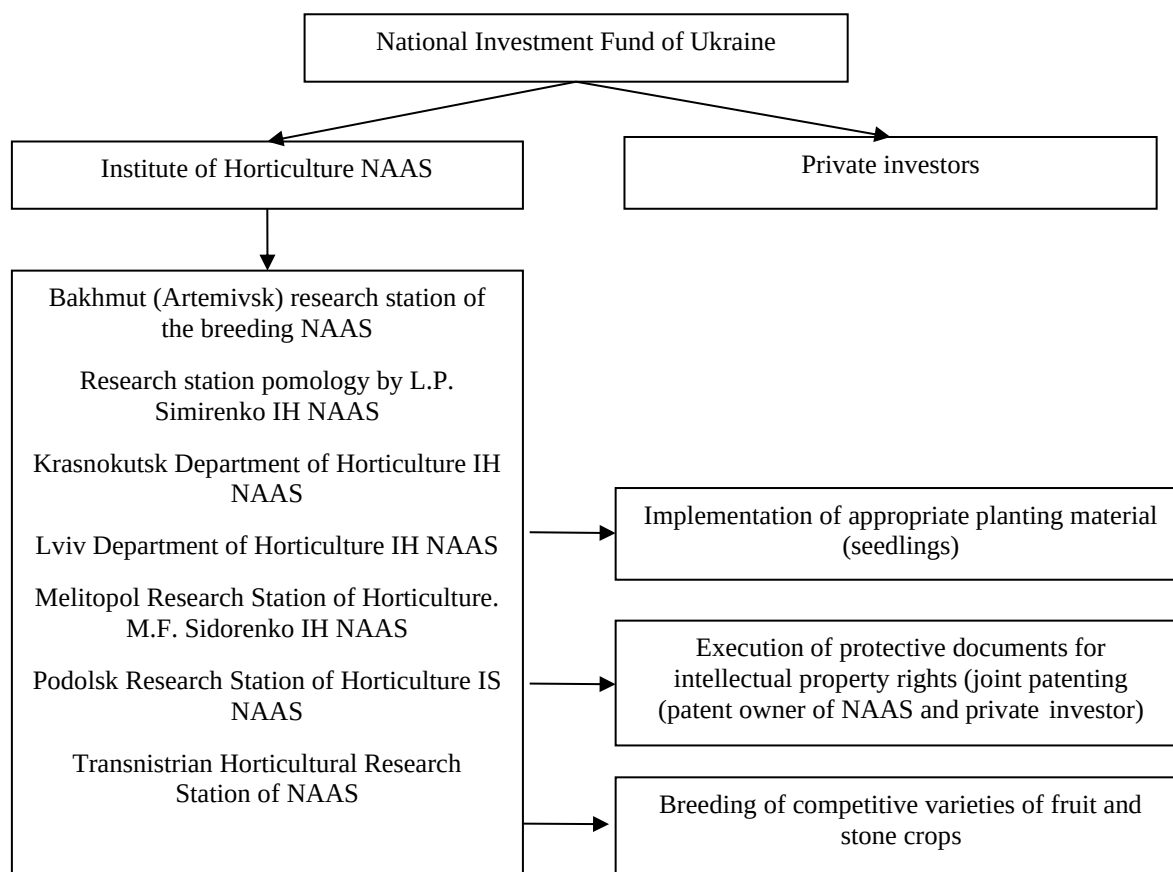


Figure 1. Model of attracting private investment in bone breeding in Ukraine

Source: [80, p. 128]

The domestic and world market of nuts is dynamically growing and solvent in the segment of fruit and berry products. The development of this industry is closely linked to many trends and trends in the agri-food market. In particular, the spread of the movement towards a healthy lifestyle, which is gradually developing in our country. Many people purposefully give up junk food and increase the proportion of natural foods in their diet, including by adding different types of nuts.

Today, the cultivation of nuts in Ukraine is carried out at the expense of personal farms and small farms, as well as the collection of walnuts is carried out in forest belts along roads of state and regional importance. Most farmers grow walnuts on their own plots in single trees, which significantly reduces the collection potential. The average is estimated at several dozen trees per one individual farm.

Farms do not use pesticides or insecticides to grow walnuts. In small gardens carry out up to 3 top dressings with fertilizers. An important aspect of walnut production is crop management after it has been harvested. Walnuts are usually harvested by hand.

Depending on the type of nut, soil fertility and climatic conditions, the yield of walnuts can be from 2 t / ha. Growing nuts is a very profitable business for both business and the public. However, walnut production in Vinnytsia region is limited by problems with the organization of production and marketing.

Walnuts are eaten raw or roasted, but they also add value in terms of taste, texture, crunchiness and food ingredients in the confectionery, bakery and baking industries, and are used with cereals in salads, especially in Waldorf salads.

The naturalness of the product is a key area of interest in foreign markets. The launch of new nut products on the market as one of the most “organic”, “natural” or “free of additives and preservatives” is very promising, at the same time statements of benefit in the form of “containing fiber”, “protein rich” and “with low sodium” are also quite popular, especially in the EU. As well as the existence of niche opportunities for organic trade and Fair Trade, other relevant trends are emerging, such as developments in the ethnic food segment.

Production of walnuts in Ukraine fluctuates at the level of 113-127 thousand tons per year (Table 4). The main volumes of production are concentrated in Khmelnytsky, Cherkasy and Chernivtsi regions. It should be noted that the largest producers of nuts are sole proprietorships and most of the sales of finished products in the form of walnut kernels are carried out in the markets, and waste (nut shell) is almost never used.

In order to maximize the production of nuts with their further processing, it is advisable to grow and process walnuts primarily on farms.

The project of creation of farms focused on production and processing of a walnut is offered and by the scientists of Vinnytsia National Agrarian University. The implementation of this project involves the following scenarios for the development of farms:

Scenario 1: in which a farmer sells a walnut kernel;

Scenario 2: where the farmer sells nut oil and nut cake;

Scenario 3: when a processor buys a walnut and sells oil and cake

Calculations of the cost of maintaining 10 hectares of the garden before fruiting for 1 year are also proposed (Table 4).

The planned revenue received for the first 20 years of the project on production in the oil and fat subcomplex for the processing of walnuts under scenario 1 and scenario 2 is about UAH 10 million, while as a result of the project under scenario 3 revenue will be over UAH 100 million. It should be noted that even with the stricter restrictions imposed in the initial conditions of scenario 3, this order does not change, which indicates the high efficiency of this approach.

Improvement of the developed scenarios can be achieved through the use of appropriate equipment for processing walnuts. Thus, Vinnytsia National Agrarian University has developed and patented appropriate equipment for walnut processing, namely a patent for nutcracker "GMK-350", which can be used to start industrial peeling of nuts, and guidelines for graphic illustrations related to science "Creation Management System" innovative products in the oil and fat subcomplex of deep processing of walnuts".

The nutcracker, which contains an electric motor, a loading hopper, a bed and a device for peeling nuts, differs in that the chipping device contains a static and movable plate with a series of wedge-shaped depressions, the angle of which varies relative to two mutually perpendicular planes. with hemispherical segments.

Calculations show that the scenario of walnut processing has a number of advantages, which significantly outweigh the disadvantages when considering the operation of the business model.

Mass production of the corresponding equipment can be started at the State Enterprise "45 Experimental Mechanical Plant". The implementation of the relevant business plan will make it possible to sell walnuts, walnut meal, walnut oils and solid biofuels (pellets from production waste).

The model of restructuring of farms "Nut Kraft" is developed, which provides for the creation of appropriate design and estimate documentation for farmers focused on the production and processing of walnuts (Table 4).

Table 4

Designing a canvas model for the development of farms focused on growing and processing walnuts *

Key partners	Key activities	Value proposition	Customer relationship	Customer relationship
Farms	Development of projects to create scenarios for the development of farms focused on the production and processing of walnuts.	Providing confectioneries with high quality raw materials Meeting the needs of the population in organic food (oil, walnut). The production of such goods is offered: walnut, nut oil, nut cake	Personal meetings with representatives of confectionery companies. Conducting product presentations at fairs. Informing customers about product prices via the Internet newsletter	1. Confectioneries (use of nuts for the production of confectionery) 2. Population (consumption of oils and walnuts proper)
	Key resources		Sales channels	
	Intellectual property for nut peeling equipment (patents copyright certificates)		Internet advertising Announcements in the media Meetings with representatives of confectionery companies	
The structure of costs for 1 year			Revenue flows Implementation of walnut Implementation of nut cake Sales of oils from nut production Wallachian Implementation of solid biofuels (pellets with production waste)	
Cost Item	Amount, рpH	The share of costs, %		
Remuneration with accruals	140700	18,01		
Fuel	57400	7,35		
Seedlings	400000	51,2		
Spraying	18450	2,36		
Mineral fertilizers	38560	4,94		
Organic fertilizers	28180	3,61		
Other costs (land rent, irrigation, etc.)	97900	12,53		
Total	781190	100,0		

Source [79]

Walnut kernel is used in the confectionery industry and animal feed. Edible nut oil, technical oil and cake oil can be processed into food or used for cattle fattening. Production waste can be processed into biofuels, as well as raw materials for other

industries (carbon production for high-tech industries). In addition, walnuts are also considered a product of this subcomplex. Other walnut derivatives are being investigated. In this study of the development of the subcomplex, as well as in the short term, the emphasis is on confectionery kernel and nut oil. With the development of the subcomplex, innovative derivative products will be created by studying and supporting the development of alternative ways of using by-products as they arise.

Walnut cake is a by-product of the process of obtaining nut oil. Unsorted walnut kernels, both raw and partially roasted, can be used in dietary nutrition, in animal feed (pigs, poultry and horses) to provide the required level of protein, micro and macronutrients contained in walnuts in significant quantities.

Walnut kernel flour is a natural concentrate of valuable nutrients that are stored in nut mucus only with the technology of direct cold pressing. In terms of composition, it is more than 80 elements necessary to ensure the normal functioning of a living organism.

Nut oil is a concentrated solution of salts of polyunsaturated fatty acids, which are stored in nut oil only by cold pressing technology. The price of nut oil usually does not allow its widespread use in industry, but there are several ways of its production that are being studied. It is used in the production of some paints, varnishes and plastics due to its good semi-discontinuous properties without color modification, which can occur when using oils with a high content of linolenic acid.

The use of nut oil in the production of agrochemicals, surfactants, adhesives, plastics, fabric softeners, lubricants and coatings has been studied. The usefulness of such products and the efficiency of their production usually depends on the prices of oil and raw materials. Nut oil can also be used as a food and can be sold by farmers under their own brands.

Thus, it can be argued that the properties of walnuts and the variety of ways to use them make walnuts of Ukrainian production a highly profitable, export-oriented product, which is gradually becoming a source of large foreign exchange earnings in the country.

Reduction of farmers' costs for planting walnut orchards is possible through the implementation of state support programs.

Significant obstacles to the entry of domestic producers of berries and fruits on the world market are a number of factors, including:

- lack of sufficient volumes of premium products for supply in European and other capacious and demanding markets;
- significant level of competition in the European market and the lack of established partners-buyers from other regions of the world;
- unexplored markets of other countries;
- there is no proper effective interaction of state institutions and producers in terms of development of norms and rules of world trade (phytosanitary control, certification, market research, information support, etc.).

According to a number of domestic horticultural farms, companies from the Scandinavian countries, Italy and Poland are currently interested in buying Ukrainian apples. In such circumstances, the issue of certification and confirmation of the quality of fruit and berry products becomes especially important.

In Europe and many other countries around the world, the most popular standard for good agricultural practice among farmers is Global G.A.P.

Global G.A.P. (G.A.P.- Good Agricultural Practice) is a program launched 15 years ago by retail chains in Europe to ensure the safe production of food and ornamental plants. The main task of GLOBAL G.A.P. is to ensure the monitoring of production. Its purpose is to confirm that food is safe and does not harm the health of customers or the health of workers involved in their production (cultivation). The certification also confirms that the production does not harm the environment. Based on the system of good agricultural practice, certification according to GLOBAL G.A.P. determines the list of criteria to be met by each manufacturer.

It is not necessary to have this certificate in order for domestic fruits and berries to cross the EU border. However, in the European Union, this certificate is an advantage that helps manufacturers enter new markets and achieve higher prices for products in negotiations with foreign business partners. In a highly competitive market

environment, certification is becoming almost mandatory. In Europe and many other countries around the world, retailers are already requiring farmers to provide Global GAP certification as a prerequisite.

For some reason, Ukrainian farmers are afraid of certification of their production according to the GLOBAL G.A.P. Fears arise primarily from lack of information. Indeed, the list of criteria for verification during certification is significant, but they are both mandatory and only recommended. In addition, preparation for certification gives the economy the opportunity to clearly understand its strengths and weaknesses, structure production processes, improve the organization of production and improve paperwork. In the fruit sector of Ukraine there are currently a number of companies that help prepare for certification and accompany agricultural enterprises during the external audit. It is quite possible to prepare for certification and successfully pass it [76, p.63-69].

Another group of problems in the development of the horticultural industry, which, in our opinion, requires state regulation, is the economic conditions in which business in gardening is developing today. As you know, gardening is an industry that requires long-term investment resources, primarily due to the fact that the young mortgaged garden at an annual cost of care begins to bring income in 5-8 years. There is no support from the state and in the field of agricultural insurance.

The horticultural industry is developing in an environment where producers of various forms of management, sellers and numerous intermediaries and retail chains are in different tax conditions, which does not contribute to the development of a competitive environment, forms inefficient and unfair relations in the distribution of income between participants market of horticultural products, primarily not in favor of producers. Among the manufacturers there are payers of income tax and VAT and those who do not pay them, which leads to a significant increase in prices for horticultural products in the domestic market, reduction demand and reduce its consumption by the population.

A significant sector of small producers of fruits and berries that grow marketable products on small plots of land and in private farms population needs more careful

research, evaluation and civilized attitude to the development of the horticultural industry.

The support of the state and public institutions for the cooperation of personal farms, the formation of partnerships with large businesses in processing and trade are necessary conditions for organizational assistance to the rural population to earn income on a legal basis, using their own resource and human potential, and promote rural development. The support of the state and public institutions for the cooperation of personal farms, the formation of partnerships with large businesses in processing and trade are necessary conditions for organizational assistance to the rural population to earn income on a legal basis, using their own resource and human potential, and promote rural development.

However, only measures to support national agriculture do not solve the problem of economic affordability of food for all segments of the population. Macroeconomic stabilization and balance are the only ways to strengthen and guarantee food security. The mechanism of interdependence such: macroeconomic development of the economy determines the growth of real incomes and, consequently, demand for food, which, in turn, determines growth rates and quality in the agri-food sector.

Thus, measures of state support for the horticulture industry to restore it in the background overall economic growth and income will contribute to the further development of the industry.