

# OPPORTUNITIES FOR THE DEVELOPMENT OF THE WALNUT MARKET WITHIN THE FRAMEWORK OF FARM ACTIVITIES

**Inobatov Abror Boshlarovich**

Renaissance Educational University, "Economics" department, Ph.D., associate professor

<https://doi.org/10.5281/zenodo.10968875>

**Abstract.** *This article highlights the possibilities of expanding the legal consultation of this process for the development of the walnut business in the Republic. Uzbekistan is one of the leading countries with economic potential and opportunities among Asian countries. Special attention is being paid to modernization and diversification of the country's economy, increasing the export potential of the agricultural sector, and taking a worthy and solid place in the world market. Walnut cultivation, development of the sector on the basis of modern technologies, walnut varieties capable of producing products that meet the requirements of the world market, introduction of economical and digital agro-technologies will ensure improvement of product quality and increase of labor productivity in the network.*

**Keywords:** *walnut, export, business, ration, specialization, risk, intensive technologies, grafting, selection, competitive varieties, plantation, vegetative, amount of annual effective temperature, mountain and sub-mountain regions.*

**Introduction.** While increasing water scarcity in agriculture and population growth due to global climate change are creating food supply challenges, demands for food quality and nutrition are also increasing.

Special emphasis is placed on the issue of daily healthy nutrition for mankind in the scientific research conducted in the field of world food supply and walnut cultivation. In such conditions, expanding the production of products that are nutritious and provide the human body with important nutrients is one of the important tasks for science and practice. In this regard, the importance of encouraging the increase in the scale of walnut cultivation is considered important.

The fact that agriculture in Uzbekistan, especially walnut groves, allows effective use of the land on the mountain slopes, and the fact that the roots of trees are of incomparable importance in the fight against soil erosion, in the implementation of flood prevention measures, and that they serve as a hedge for other crops reflect the economic and reclamation importance of walnut. Also, walnut oil and concentrate are widely used in the preparation of preparations and mixtures for the fields of medicine, perfumery, visual arts, and printing. In general, except for the valuable fruit of the walnut, all vegetative organs (wood, leaves, pods, even the plasticine between the kernels) can be used in various sectors of the economy and the national economy, and walnuts can be used on the basis of waste-free technology.

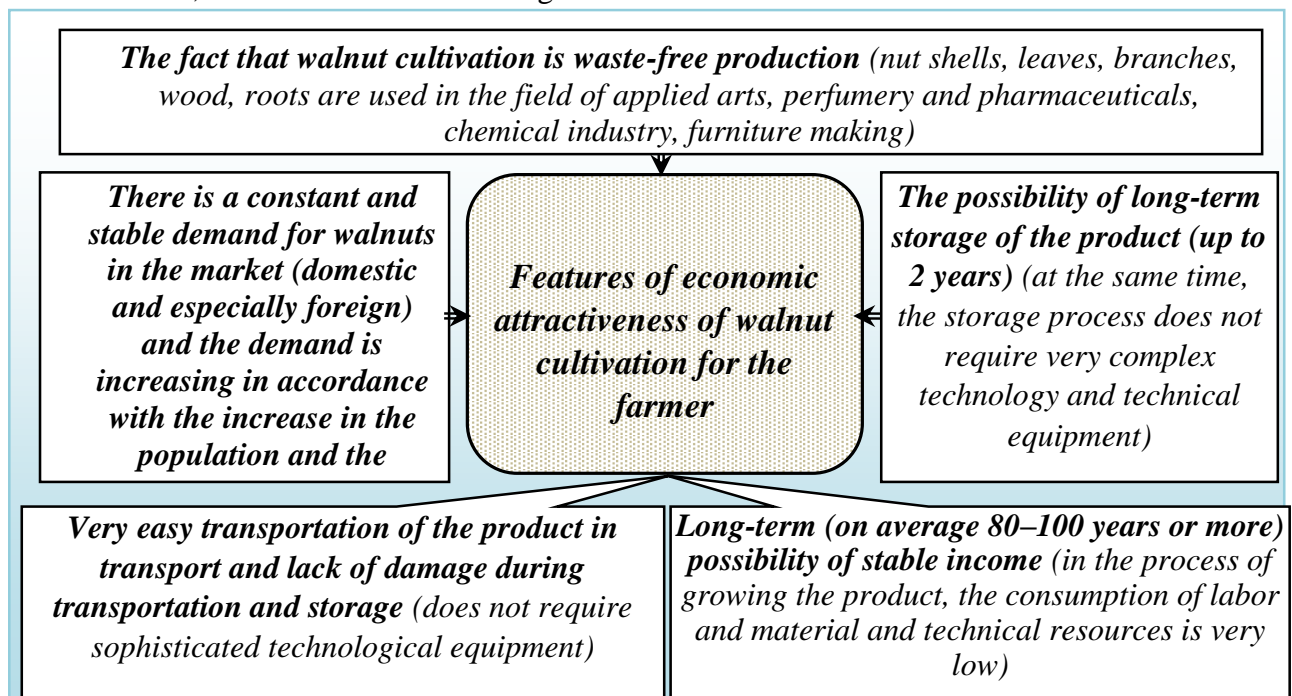
Decree of the President of the Republic of Uzbekistan No. PQ-4575 of January 28, 2020 "On measures to implement the tasks set in the strategy for the development of agriculture of the Republic of Uzbekistan for 2020-2030" and No. PQ-4424 of August 23, 2019 "On increasing the efficiency of the use of forests in the Republic" "On additional measures" dated June 1, 2017 PQ-3025 "Walnutserves to a certain extent in the implementation of the tasks defined in the decisions

of the Association of Producers and Exporters and Organization of its Activities" and other regulatory legal documents related to this activity.

**Review of literature.** Developing relevant scientific and practical recommendations on the development of walnut production, increasing the economic efficiency of product production, improving the marketability of the product, attracting investments to the walnut production process, the features of walnut cultivation and their use in the world, foreigner M. Konstantinova, Yu. In the research of such scientists as Grinyuk, S.G. Biganova, Yu.I. Sukhorukikh, A.P. Lugovskoy, S.A. Nam, N.G. Petrova, Z.A. Ibragimov, O. Yurina, O. Yu. Orlova reflected. In the conditions of Uzbekistan, scientific research conducted by scientists such as B. Nosirov, O. Shaymatov, H. Hamroev, D. Yormatova, M. Abdujabborov, and N. Khushmatov focused on finding solutions to the economic problems of walnut cultivation and developing the sector.

**Research methodology.** In the course of research, methods of comparative analysis, abstract thinking, economic calculation, expert assessment, and monographic observation of farms were used.

**Analysis and results.** Analysis shows that walnut is an economically profitable, return-on-investment nut with the following economic characteristics (Figure 1). Among the following characteristics, I can observe that walnut grows well in mountainous and sub-mountainous areas.



**Figure 1. Features of economic attractiveness of walnut cultivation[1]**

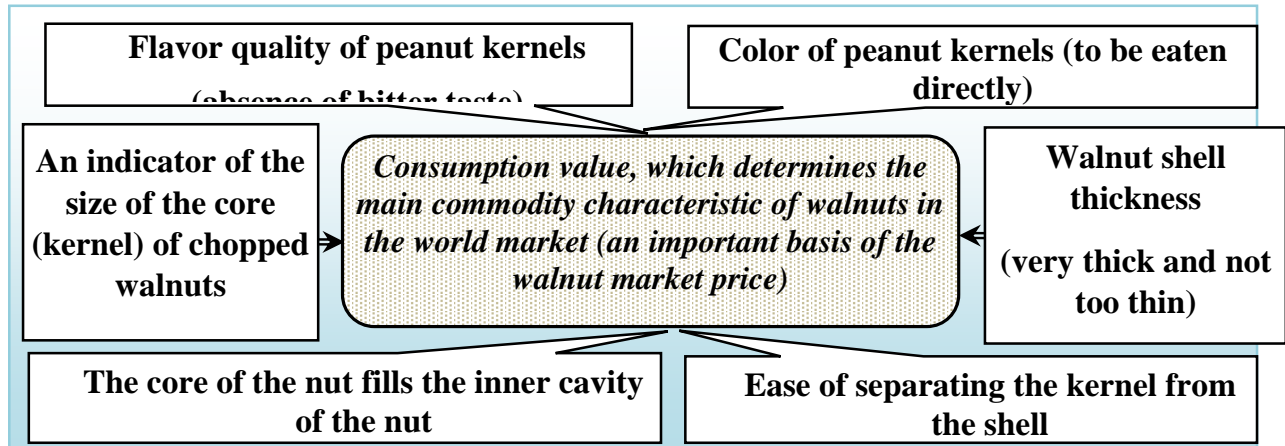
Heat-loving, light-loving, and dislike of high air humidity create a favorable opportunity for growing walnuts in the Republic. The above-mentioned features are important for farmers and other business entities in setting up walnut production activities and investing in the sector.

The slow onset of yield of walnut, yielding one year and not the next, reduces land use efficiency. Also, it is not possible to plant other crops between the rows, the trees occupy a large area (one tree occupies almost 1 hectare), it is necessary to establish walnut groves mainly in dry, mountainous and sub-mountain regions.

According to researches, the economic attractiveness for the businessman is related to the constant demand for walnuts in the domestic and foreign markets, and the amount of demand is constantly increasing. In this:

- the importance of walnuts as a food in the human diet, which has been proven by science with indisputable indicators, is more and more widely disseminated to the public's mind;
- the volume of nut cultivation in the world market is much less than the market demand, the ease of transportation without spoiling the quality and reducing the volume;
- the fact that storage, transportation and unloading do not require complex equipment makes it highly attractive.

Currently, the commodity characteristics (consumer value) of walnuts in the world market are evaluated by the following indicators (Figure 2):



**Figure 2. Marketability of walnuts in local and world markets characteristics that determine the level [2]**

The above indicators reflect the requirements for the quality of walnuts in the world market, on the basis of their provision, the possibility of high profit of entrepreneurs increases. That is why, in the establishment of high-income walnut groves (farms), the selection of walnut varieties is a very important issue. A poorly selected variety can delay the producer's ability to profit from the land for several more years, causing a long year of labor and other costs to be wasted.

In the process of kernel separation, the kernel weight decreases and the average price changes due to the fact that it is easy to remove the whole kernel from fertile nuts, and it is difficult to separate the kernel from ungraded nuts (Table 1).

Due to the different shape and shell thickness of walnuts, it is difficult to determine the productivity based on the unshelled walnuts and make an economic assessment of the efficiency of walnut cultivation. For example, the average kernel yield in wild walnuts is 30–35 percent, while in cultivated walnuts it reaches 45–55 percent.

Also, it is necessary to pay attention to the question of productivity when planting walnuts, because of the difficulty of separating the core, crushing during cleaning, and the decrease of labor productivity. Variegated nuts have a shorter period of entry into the crop, and a much higher yield.

Usually, the peeled walnut kernel (kernel) is graded with 5 categories. Products in each category are sold for a specific purpose based on market demand, and the product price is formed accordingly. If we focus on the established market prices, we can observe a significant difference between the categories.

Also, market demand sometimes changes inexplicably. For example, the products of the first and second (mainly the first) category are sold at different prices depending on the color of the kernel. If we evaluate the walnuts exported from Uzbekistan from the point of view of the Russian markets, the color of the walnut core changes as follows (Table 2). The difference between

market prices formed by color is up to 200 rubles per kilogram, or up to 1.6 times compared to the highest price (the price of walnut kernels of the white "Butterfly" category).

*Table 1.*

*Categories of walnut kernels offered to the market by size (Russian market) (at average prices in 2022) [3]*

№	Categories of walnut kernels	Appearance as a product	Usage purpose	Average price (kg/\$) [4]
1.	<b>Butterfly</b> ( <i>baby girl</i> )	The kernel of the nut is divided into two equal parts and looks like a butterfly	It is consumed directly as a ready-made food product.	5,7–8,9 USD
2.	<b>Quarterly</b> ( <i>quadrutushka</i> )	The walnut kernel is divided into four equal parts.	It is eaten directly and added to various dishes (salad).	4,9–7,3 USD
3.	<b>Half a quarter</b> ( <i>vosmushka</i> )	Usually, the nut kernel consists of pieces divided into eight.	It is used in the preparation of cakes, cookies and other similar products.	3,2–4,1 USD
4.	<b>A small piece</b> ( <i>melkie kusochki</i> )	These are small pieces of nut kernels, usually 4–6 mm in size.	It is used in the preparation of confectionary products and processed nut butter.	2,9–3,6 USD
5.	<b>Walnut flour</b> ( <i>orexovaya muka</i> )	The smallest part of the nut kernel that has passed through a sieve.	It is added to the dough and used in the preparation of cakes, various pastries and nut cream.	1,1–2,3 USD

*Table 2.*

*Market according to the color of the walnut kernel offered categories [5]*

Walnut kernel category	The color of walnut kernels	Average price (kg/ruble)	Differences in price changes
<i>Butterfly</i>	White	540	"1,0"
	Wheat color	470	"1,15 times"
	Light white	440	"1,23 times"
	Light brown	340	"1,59 times"

If we analyze the grown nut products by farms, the share of farms was 30.7 percent in 2011, 21.6 percent in 2015, and 7.6 percent in 2022 (Table 3).

The share of peasant households was 61.7 percent in 2011, 77.3 percent in 2015, and 91.5 percent in 2021. It can be seen that there is an increasing desire to have a source of income through the cultivation of walnuts in the peasant farms, and the population is effectively using the existing walnut groves and getting an additional source of income.

The area of walnut and almond plantations established with the support of the Association of Nut Producers and Exporters was 11,733 hectares in 2018-2021. If we take into account planting 220-240 trees per hectare when establishing plantations, this means that 4-5 tons of nuts can be obtained on average per hectare (Table 4).

*Table 3*

*There are different types of walnut cultivation in the republic share of households [6]*

Households		Years, (percentage)					
		2011	2013	2015	2017	2019	2022
<b>Farmer farms</b>	quantity, tons	17200,0	17245,0	18848,0	9410,0	6175,0	8253,6
	share, in percent	30,7	26,0	21,6	8,5	6,8	7,6
<b>Peasant farms</b>	quantity, tons	34572,0	47756,0	67467,0	10136,0	84024,0	99369,0
	share, in percent	61,7	71,9	77,3	91,2	92,7	91,5
<b>Another village farm enterprises</b>	quantity, tons	4 305,0	1 391,0	992,0	355,0	432,0	977,4
	share, in percent	7,7	2,1	1,1	0,3	0,5	0,9

*Table 4*

*In order to get more harvest from the walnut tree in the republic intensive gardens are being established [7]*

Tree variety, nut quality	Planting order	Tree age	Seedlings per hectare, pcs	Productivity		Nut price (kg/soum, €)	Total profit, soum
				From one bush, (kg)	From one hectare of land, (s)		
<b>Horticulture, viticulture and winemaking named after Academician M.Mirzaev created at the scientific research institute</b>							
<b>Bostonian pith light green</b>	10x10	8-10	100	10	150000	15000	15 000 000
		10-15		25	420000		42 000 000
		15-20		45	810000		81 000 000
<b>Ideal pith light green</b>	10x10	8-10	100	10	150000	15000	15 000 000
		10-15		28	420000		42 000 000
		15-20		57	855000		85 500 000
<b>Jubilee core is light green</b>	10x10	8-10	100	12	180000	15000	18 000 000
		10-15		28	420000		42 000 000
		15-20		56	870000		87 000 000
<b>Imported varieties of walnuts</b>							
<b>CHANDLER (USA) Core white</b>	4x8	4-6	246	20	4920	5 euro	24 600 €
	4,5x9	7-10		40	9840		49 200 €
	6x7	11-15		70	17220		86 100 €
<b>CAZACU (Moldova) Core white</b>	4x8	4-6	238	20	4760	5 euro	23 800 €
	4,5x9	7-10		40	9520		47 600 €
	6x7	11-15		70	16660		83 300 €
		11-15		70	16660		83 300 €
<b>Cisco (France) Core white</b>	4x8	4-6	238	20	4760	5 euro	23 800 €
	4,5x9	7-10		40	9520		47 600 €
	6x7	11-15		70	16660		83 300 €

Scientists of our Republic have created a number of varieties of walnuts, and although their products are of high quality and productivity, they cannot fully meet the requirements of the world

market in terms of their kernels. In particular, the non-white kernel of the walnuts of the varieties shown in the table is one of their main disadvantages. That is why American varieties dominate the world market today, and entrepreneurs try to import these varieties.

If we take into account that the price of one kilogram of walnuts in the Republic in 2022 is 12-15 thousand soums (wholesale), this will allow walnut growers to get 24,600 Euros from each hectare of walnut plantations. According to monographic studies, the average yield of walnuts on farmers' farms is 120 kg (20-year-old tree), and the maintenance costs of 1 walnut tree are on average 350,000 soums. Then the cost of growing 1 kg of walnuts is 2916 soums, the value of the product obtained from 1 bush of walnuts is 2460 thousand soums, and the net profit is 2110 thousand soums.

On the basis of monographic studies, the indicators of the economic efficiency of product cultivation in the intensive walnut plantation in the Parkent district were calculated (Table 5).

**Table 5**

***Indicators of economic efficiency of product cultivation in the intensive walnut plantation in Parkent district***

№	Indicators	Years					
		2017 y (1st year)	2018 y (2nd year)	2019 y (3rd year)	2020 y (4th year)	2021 y (5th year)	2022 y (6th year)
1.	Number of seedlings per reporting period, pcs	238	238	238	238	238	238
2.	Loss during the year (drying, etc.), %	10	5	3	0	0	0
3.	Number of dead seedlings	24	12	7	0	0	0
4.	Total number of harvested seedlings, pcs	214	226	231	238	238	238
5.	The price of buying a bunch of walnut seedlings, thousand soums	40000	40000	40000	40000	40000	40000
6.	The value of seedlings planted per hectare, thousand soums	9520,0	952,0	476,0	285,6	x	x
7.	The cost of purchasing drip irrigation equipment, thousand soums	35000,0	500,0	500,0	500,0	500,0	500,0
8.	Consumption of chemical preparations and fertilizers per hectare, thousand soums	5710,0	8845,0	9950,0	11050,0	12325,0	13458,0
9.	Planting costs per hectare, thousand soums	5760,0	1428,0	714,0	428,4	x	x
10.	Average yield from one tree, kg	x	x	x	3	14	20
11.	The yield of one hectare of nuts is average, kg	x	x	x	714	3332	4760
12.	The price of one kg of nuts, soums	x	x	x	17000	21000	25000
13.	The price of the harvest from one bush of walnuts is one thousand soums	x	x	x	51,0	294,0	500,0
14.	The value of the harvest from one hectare of walnut grove, thousand soums	x	x	x	12138,0	69972,0	119000,0



15.	Total cost per hectare, thousand soums	55990,0	11725,0	11640,0	12264,0	12825,0	13958,0
16.	Profit (+), loss (-) from a walnut grove, thousand soums	-55990,0	-11725,0	-11640,0	-12,6	57147,0	109491,0
17.	Production efficiency, %	x	x	x	x	446	784
18.	Return on Investment in Walnut Cultivation	-55990,0	-67715,0	-79355,0	-68443,0	-11296,0	98195,0

According to the calculations, walnut plantations organized on the basis of intensive plantations start to produce from 4 years, but can cover expenses only after 6 years. In this case, the main expenses go to the installation of a drip irrigation system (purchase of technical equipment and technology) (52.2%), the purchase of mineral fertilizers, chemical preparations against walnut diseases and pests (18.8%), and the purchase of intensive walnut seedlings (16%). On average, 240 saplings are planted on one hectare, and walnut groves are replenished with new walnut saplings for up to 3 years instead of sprouts that have died due to various unforeseen reasons.

In the conditions of full compliance with the agrotechnics of nut plantation care, in the conditions of our Republic, the yield will be around 3.0 t/ha by the fifth year and around 4.7 t/ha by the sixth year, and the period of covering the expenses spent on the establishment of plantations will begin. Since this year, the level of profitability of growing products is 446 percent, which shows the extremely high level of profitability of walnut cultivation.

**Conclusions and suggestions.** Based on the above thoughts and results of analysis, the following conclusions can be drawn:

- currently, walnuts are grown in the republic mainly on the basis of wild walnuts planted in the plots of the population and unsystematically planted wild walnuts, so it does not allow to ensure the quality of walnuts within the requirements of the world market;

- The development of the confectionery industry in Uzbekistan and the fact that it is a tradition for families to prepare various pastries, the increasing consumption of walnuts at various weddings and ceremonies indicates the development of the domestic market and ensures the stability of market demand;

- Along with the increased interest in walnut cultivation in farms based on the increase in walnut exports in Uzbekistan, attention to walnut cultivation at the level of state policy encourages the expansion of walnut plantations;

- the lack of knowledge about walnut cultivation among the population engaged in walnut cultivation, in particular, the lack of knowledge about walnut diseases and insects, as well as the low possibility of acquiring countermeasures and tools, are the main problems with the increase in the volume of walnut cultivation;

- there is an increasing need to develop infrastructural facilities for growing, preparing, processing and offering high-quality walnuts for sale, and in this, first of all, there is an increasing need to establish a system of providing scientific advice to producers, as well as to establish a plantation of high-quality walnuts;

- stimulation of scientific research in the direction of creation of high-yielding walnut varieties suitable for the natural climatic conditions of the regions and capable of producing products within the requirements of the world market is one of the urgent issues;

- Ease of growing walnuts in mountainous regions of Samarkand, Tashkent, Kashkadarya, Surkhandarya, Jizzakh, Namangan regions, long-term experience of walnut growers is an important natural-intellectual potential in the development of the walnut market;

- today, the introduction of foreign walnut seedlings into the republic, the establishment of walnut plantations in the future, and the possibility of walnut export are a factor that further increases;

- since the establishment of walnut plantations requires initial investments and the walnut business begins to return to the entrepreneur only after 5-7 years, it is important to allocate subsidies and introduce effective credit systems that encourage export.

### **REFERENCES**

1. Decision PQ-3025 of the President of the Republic of Uzbekistan "On the establishment of the association of walnut producers and exporters and organization of its activities". - 2017 [www.lex.uz](http://www.lex.uz)
2. Decision PQ-4424 of the President of the Republic of Uzbekistan "On additional measures to increase the efficiency of the use of forests in the Republic". August 23, 2019.
3. Decision PQ-4575 of the President of the Republic of Uzbekistan dated January 28, 2020 "On measures to implement the tasks set in the strategy for the development of agriculture of the Republic of Uzbekistan for 2020-2030".
4. Inobatov A.B. Effectiveness of using promising varieties in walnut cultivation// "Agroeconomy". Tashkent, 2021.
5. Inobatov A.B. The role and importance of developing the possibilities of walnut cultivation in farms // "Khorazm Ma'mun Academy Newsletter". Khiva, 2022.
6. Inobatov A.B. Issues of increasing the efficiency of walnut cultivation in farms// "Agroeconomy". Tashkent, 2022.
7. Khushmatov N., Inobatov A. "Directions of increasing the economic efficiency of walnut cultivation in farms" Monograph. "Innovative Development Publishing House". Tashkent, 2021.
8. Khushmatov N.S., Inobatov A.B. "Resource-saving technologies in the cultivation of walnuts in terms of economic evaluation methodological approaches" Journal of Contemporary Issues in Business and Government Vol. 27, No. 1, 2021. – P-ISSN: 2204-1990; E-ISSN: 1323-6903 // <https://cibg.org.au//pdf//> –P. 957-968.
9. Inobatov A.B., N.S. Khushmatov "Pricing formation and market variability characteristics in walnut cultivation and its delivery to consumers" Turkish Journal of Computer and Mathematics Education Vol.12 No.7, 294-301 online: 16 April 2021. - P. 294-301 .
10. Inobatov A.B. Economic stimulation of walnut market development in Dekhkan farms// "Science and Education in Karakalpakstan" Nukus, 2023.
11. Inobatov A.B., Ziyadullaev I "Improving the methodology for predicting the yield of walnuts in farms based on econometric models" E3S Web of Conferences 376, 02001 (2023)