

Pricing Formation And Market Variability Characteristics In Walnut Cultivation And Its Delivery To Consumers

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Abstract: In this article, the authors describe the features of growing walnuts in Uzbekistan, the sale of grown products in terms of economic efficiency. It was noted that the cultivation of walnuts in small-scale farms does not allow to ensure the quality of the product, the inability to follow the agronomic techniques of walnut tree care leads to a decrease in product quality. Based on the results of the analysis and research, conclusions were developed and recommendations for the development of the yoghurt coconut business were included in the article.

Keywords: Walnut, walnut plantations market price formation, market demand, farmers market, walnut business, walnut yield, walnut welding

In the cultivation of walnuts in small farms in Uzbekistan, walnut trees are planted irregularly on the edges of fields, roadsides, rocky places. As a result, it is difficult to feed the trees, disease control measures. Also, the walnut business is a new industry for Uzbekistan in its modern form, and attention is only now being paid to the cultivation of walnuts as a lucrative industry. Rural entrepreneurs are just beginning to realize that the nut business brings good economic benefits to the entrepreneur. However, this industry also has a number of features that encourage and limit entrepreneurial activity. It is important to know them before starting a nut business, to conduct marketing analysis in this regard, to understand the initially invisible features of the business. It has the following important features: First, the demand for nut products in domestic and foreign markets is increasing year by year. An increase in market demand means that market demand will not decrease in the future in proportion to the degree to which people care about their health and have more information about the benefits of nuts. According to data released by the International Council on Dried Fruits and Nuts (INC) in May 2018, the number of consumers of walnuts, almonds and hazelnuts in the world is expected to more than 1 billion and double by 2030; secondly, the low number of walnut-growing entities in Uzbekistan on large industrial coconut fields at present shows that competition in the market between producers is not strong. However, there are a number of factors that limit entrepreneurial activity, which can reduce the amount of quality walnut cultivation and entrepreneurial initiatives. In particular, the apparent seasonality of the walnut business and the impossibility of using walnut orchards for additional agricultural purposes often limit the activities of entrepreneurs investing in the sector. This is because the walnut tree releases a chemical from itself, reducing the opportunity for plants to share nutrients in the soil in the area where it grows. Lack of land required for planting walnuts in Uzbekistan is one of the major challenges in developing the walnut business. This is because the long-term (100-150 years) occupancy of fertile, irrigated agricultural crop fields for walnut cultivation can have a negative impact on food supply and assortment maintenance. One of the most important limiting factors in the walnut business is that most entrepreneurs are reluctant to wait long for the return on investment (the period when the walnut tree comes into fruition). It should be noted that the most costly period of growing walnuts is the period of establishment of the walnut plantation, which has a very low cost of production for many years (up to 100-150 years) after the trees are harvested, which makes it an investment attractiveness for the entrepreneur. The economic efficiency of growing the crop is very high, and if we pay attention to the calculations of experts, varietal nuts after 8 years will get a good harvest and begin to give an average of 18 kilograms of product per tree.

If we take into account the planting of 180-220 trees per hectare, this means an average of 3.5 tons of quality walnuts per hectare. If we take into account that the average price of walnuts in the Uzbek market today is 12-15 thousand soums (retail), this means that the producer will receive a profit of 4500-5000 US dollars per hectare of walnut. If we take into account that the annual current costs associated with the implementation of agro-technical measures on walnut plantations in 2018 will not exceed 1200-1500 thousand soums (without drip irrigation), the profitability of walnut production for the entrepreneur is very high. According to industry experts, walnut cultivation in Uzbekistan gives good results in Bostanlyk, Parkent, Ahangaron districts of Tashkent region, Fergana Valley and mountainous areas of Jizzakh region, mountainous areas of Andijan, Samarkand, Surkhandarya, Navoi and Kashkadarya regions. However, if we approach this issue in terms of market demand for walnuts and the formation of market prices for the product, we need to pay attention to another important aspect of the issue regarding the change in market demand for walnut products and the mechanism of price formation. In particular (Figure 1): First, although walnuts have been grown in the above-mentioned regions of

the republic for centuries, the cultivated walnuts are mainly wild walnuts randomly selected by the population, and their yield and product quality often do not meet world market demand; Secondly, along with the cultivation of walnuts by rural families on their own lands, even in a single garden, different walnut trees grow in different sizes of fruits (mainly unripe small fruits), kernel separation, shell thickness and kernel quality. Hence, in this case, the quantity that meets the market demand and the difficulty of preparing the product in batch, sharply reduces the market price of the product; Third, the locals trade in walnut fruits mainly in local markets. If attention is paid to the direction of use of purchased products, the population uses nuts for various ceremonies, for consumption in the family, or for making various pastries at home. Hence, the quality of the product was also formed on the basis of market demand in the local context;

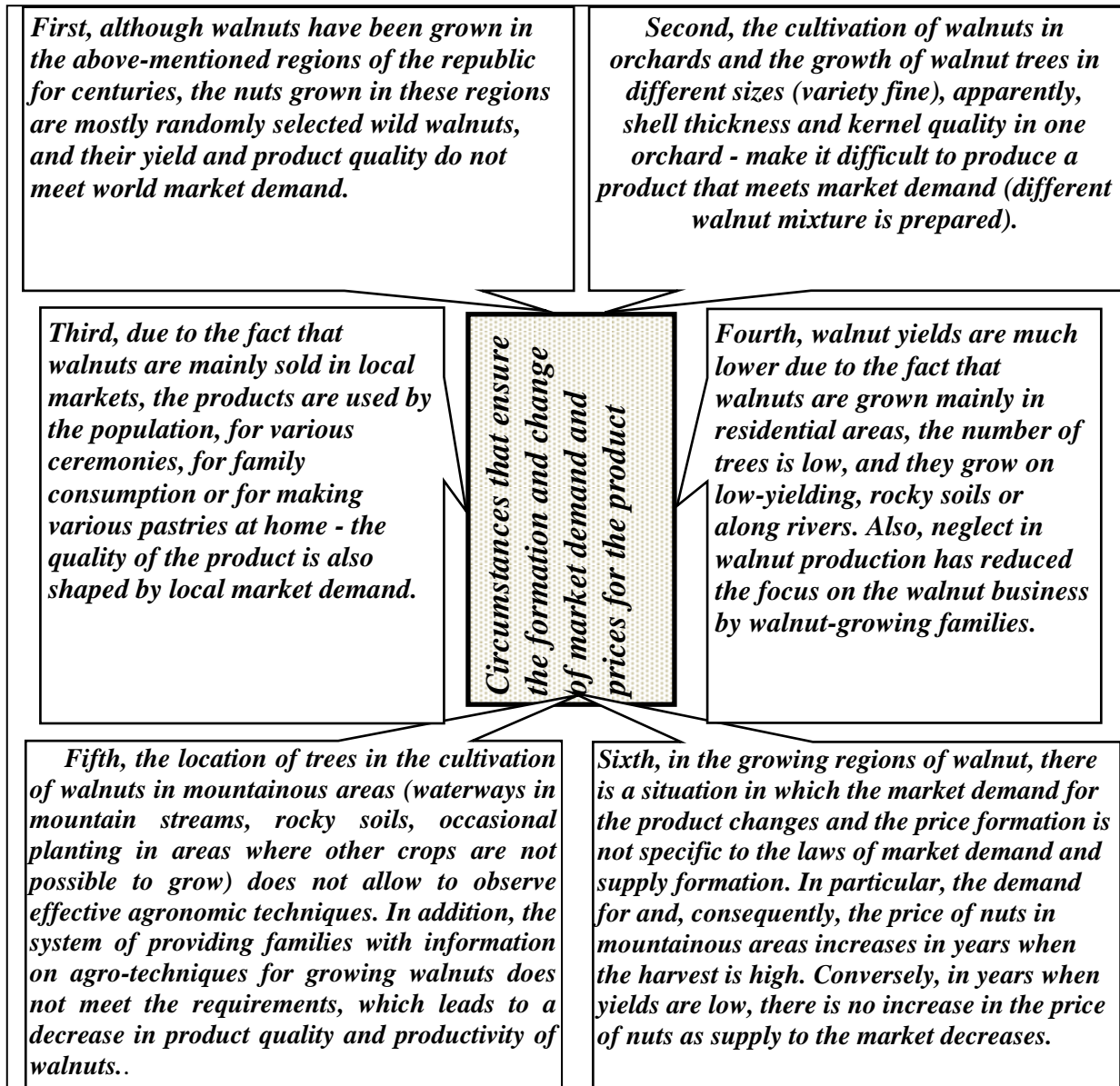


Figure 1. Important aspects in changing market demand and price formation for walnuts

Fourth, the cultivation of walnut trees in populated areas in walnut-growing areas, the low number of trees in the garden, the growth of rocky soils with very low soil fertility, or the growth of mountain rivers along streams, reduce tree productivity. Also, the fact that walnuts do not yield one year and produce a second year has led to a decline in attention paid to the walnut business by rural families who grow walnuts; Fifth, the location of trees in the cultivation of walnuts in mountainous areas in Uzbekistan (occasionally planted in mountain streams, rocky soils, where other crops are not possible), does not allow to follow the agronomic techniques of walnut cultivation. More precisely, the issue of providing walnut growers in mountainous areas with information on quality walnut cultivation agrotechnics does not meet the requirements. This is one of the

main factors leading to a decrease in product quality and productivity of nuts. According to monographic observations, due to the lack of control measures against diseases and pests of walnut trees and fruits in the mountainous areas of Payarik district of Samarkand region, where walnut plantations have existed for centuries, 30-40% of walnut crops and up to 60% of some trees die. observed to be In our opinion, the following factors are the cause:

- The size of most trees, branched growth up to 30-40 meters in height, makes it difficult to control pests and diseases;

- Lack of traditional agro-technical measures, lack of special technical means;

- Lack of information for nut growers about walnut diseases, insects and drugs used to control them leads to crop failure. In the mountainous areas of Uzbekistan, where walnuts are grown and cultivated, there is a change in market demand for walnuts and the formation of prices is not typical of the laws of market demand and supply. In particular, according to the laws of supply and demand, a decrease in market price and, conversely, a decrease in supply of a product during a period when the product is more offered to the market should lead to an increase in market price (unless other factors influence). However, in mountainous areas where walnuts are grown, the demand for and consequently the price of walnuts also increases in years when the harvest is high. Conversely, in years when yields are low, supply to the market also decreases, while an increase in the market price of nuts is not observed. This situation can be explained by the fact that the costs associated with the transportation of low-batch products in mountainous areas do not justify themselves. In general, the analysis of the situation associated with changes in market demand and price formation in the cultivation and sale of walnuts shows that the current situation in Uzbekistan makes it difficult to enter the market with quality products that meet world market demand. However, as a result of the increase in exports of walnuts over the past 5 years, the requirements of the world market are reaching walnut producers through the activities of entrepreneurs in the mountainous regions where walnuts are grown. This encourages the organization of production on the basis of new varieties of walnut, which allows to grow quality products. In particular, the adoption of the Resolution of the President of the Republic of Uzbekistan dated June 1, 2017 No PP-3025 "On the establishment and organization of the Association of Walnut Producers and Exporters" accelerated the process. As part of the implementation of the decision, plantations based on walnut varieties are being established in the country, which will allow to grow products that meet the requirements of the world market. It further expands the possibilities of effective use of the potential of mountainous, foothill agricultural areas of the republic (dry lands, formed experiments, climatic conditions, spring waters, groundwater). The scope of scientific research aimed at increasing the production of competitive walnuts in domestic and foreign markets, the establishment of modern walnut plantations through the widespread attraction of foreign investment and the development of intensive technologies for growing walnuts is also expanding. The resolution developed a program of measures to further increase the volume of walnut production in 2017-2021: - 2017-2019 - import of walnut seedlings to the republic, 2018-2019 - import of welds for welding walnuts;

- 2020 - production of high-yielding varieties of walnuts in the laboratory in accordance with the natural and climatic conditions of the region; - In 2018-2020, measures are being taken to grow walnuts and sell them on the domestic and foreign markets. The participants of the Association of Nut Producers and Exporters, established by the decision, will be exempted from customs duties on imported drip irrigation equipment, special agricultural machinery, walnut seedlings, grafts, welders, maternal materials, which are not produced in Uzbekistan until 2020. allows the organization of nuts in the form of plantations. Walnuts grown in plantations are characterized by their marketability, high profitability to the producer, due to the fact that the plantations are organized using promising varieties of walnuts, taking into account market demand. Observations of farmers' markets in Tashkent show that if we approach the formation of market prices:

- Walnuts are sold up to 50% more expensive than small walnuts;

- Walnuts harvested last year are 30% more expensive than freshly harvested walnuts (only knowing whether a walnut is new or old requires some knowledge and experience); - In addition to the more expensive sale of peeled walnut kernels, it should be noted that such a product decomposes faster than raw walnuts, contaminated with dust and other harmful substances. For example, a kilogram of peeled walnut kernels ("butterflies") costs 60,000-80,000 soums, while the price of packaged walnut kernels in plastic bags of different weights varies from quarter to quarter. For example, a 500-gram walnut kernel costs \$ 6.0, and a 200-gram walnut kernel costs \$ 2.5. The average price of walnuts also differs in the markets of Tashkent. For example, in 2019, the average price of unpeeled walnuts in Chorsu market is 2.4-2.7 times higher than in Koylik market, while the average price of walnuts sold in Yunusabad farmers' market is 20% higher than in Koylik market. The average prices of walnuts sold in sheep farms are almost indistinguishable. The price of refined walnut kernels at farmers' markets in Tashkent also had similar differences to the price of unrefined walnuts in 2019. There are also differences in the prices of markets in the central cities of the regions of the country and in the markets of Tashkent. For example, farmers in Bukhara are 1.4 times cheaper than in Koylik, one of the cheapest points of sale in Tashkent, 1.4 times in Termez, 1.2 times in Chirchik and 2,1 times in Samarkand. It was noted that while the focus on walnut cultivation in the republic at the state level and walnut cultivation in general has only increased

in recent years, the lack of a statistical reporting system in this regard also reduces the quality of analysis (Table 1).

Table 1
Changes in the area, gross yield and yield of nuts in the country

Name of indicators		Farms		Farms	
		Land, thousand ha	Gross yield, thousand tons	Land, thousand ha	Gross yield, thousand tons
2010	Walnuts, total	2,3	4,7	4,3	26,8
	Including:				
	Greek walnut	1,3	3,5	2,9	20,7
2011	Walnuts, total	3,9	17,2	4,6	34,6
	Including:				
	Greek walnut	1,6	7,8	2,8	21,4
2012	Walnuts, total	2,7	11,0	4,4	38,2
	Including:				
	Грек ъНГОФИ	1,7	7,2	2,5	21,0
2013	Walnuts, total	3,4	17,2	5,1	47,8
	Including:				
	Greek walnut	1,7	6,9	2,5	21,4
2014	Walnuts, total	3,7	14,9	5,6	57,4
	Including:				
	Greek walnut	1,7	6,5	2,6	22,5
2015	Walnuts, total	3,7	18,8	5,6	67,5
	Including:				
	Greek walnut	1,7	6,1	3,1	26,8
2016	Walnuts, total	3,8	20,8	6,0	76,6
	Including:				
	Greek walnut	1,7	5,9	3,3	32,3
2017	Walnuts, total	3,3	9,4	7,3	101,2
	Including:				
	Greek walnut	1,8	5,0	4,0	40,2

In particular, according to the operative data of the Ministry of Agriculture, in 2010 the total area of walnut farms in the country was 2,300 hectares, of which 1,300 hectares were walnuts. The main part of nuts is peanuts (peanuts), which is often planted by the population as a secondary crop, which complicates the completeness of data on its area under cultivation and crop yields. The analysis shows that the volume of exports of nuts from the republic, including walnuts, has not been relatively stable over the years (Table 2). In particular, the export volume of peeled walnuts in 2010 amounted to 1024.6 tons, while in recent years it decreased to 430.9 tons in 2017 or 42% compared to 201. Focusing on the change in the volume of peeled walnut exports, the sector exported 7,263.4 tons of products in 2017 instead of 8,316 tons in 2010, which is 87.3% more than in 2010.

Table 2
Trends in the volume of exports of nuts throughout the country

Product name	2010	2011	2012	2013	2014	2015	2016	2017	In 2017 compared to 2010, (%)
<i>Unrefined walnuts</i>	1024,6	795,7	934,5	714,5	859,6	256,9	276,2	430,9	42,0

<i>Peeled walnuts</i>	8316,0	7939,7	4611,1	9746,0	10652,1	4371,8	2325,7	7263,4	87,3
<i>Almonds not peeled</i>	228,0	107,5	81,2	64,4	108,3	45,2	88,7	162,2	71,1
<i>Almonds peeled</i>	222,9	132,4	179,1	150,0	169,6	143,2	112,3	546,2	245,0

However, almond export volumes have been relatively stable over walnut exports over the years under study. In particular, in 2010 and 2017, the volume of exports of raw hides decreased by 71.1%, while the export of peeled almonds increased from 222.9 tons in 2010 to 546.2 tons in 2017, an increase of almost 2.5 times. The analysis of changes in the prices of the main types of nuts exported from the republic, including walnuts, shows that the average prices of the product have changed over the years (Table 3). In particular, it can be observed that the average selling prices for the export of nuts decreased. For example, the average price of unrefined walnuts fell from \$ 2.5 in 2010 to \$ 1.91 in 2017, or 32 percent. However, the fact that the decline in the average price of refined walnuts was relatively small (down from \$ 4.01 in 2010 to \$ 3.19 in 2017, or 76.4 percent) indicates that market demand for refined walnuts is increasing.

Table 3 Trends in the value of exports of nuts in Uzbekistan

Product name	2010	2011	2012	2013	2014	2015	2016	2017	In 2017 compared to 2010, (%)
Unrefined walnuts	2561,5	1889,1	3173,1	3705,5	5961,6	1124,8	546,2	822,8	32,1
<i>Average price per kilogram, (kg / \$)</i>	2,50	2,37	3,40	5,19	6,94	4,38	1,98	1,91	76,4
Peeled walnuts	33384,4	34179,0	20733,4	93334,4	124219,4	57241,2	13341,0	23158,2	69,4
<i>Average price per kilogram, (kg / \$)</i>	4,01	4,30	4,50	9,58	11,66	13,09	5,74	3,19	79,6
<i>Almonds not peeled</i>	923,0	483,4	276,0	380,6	916,3	408,7	446,2	703,2	76,2
<i>Average price per kilogram, (kg / \$)</i>	4,05	4,50	3,40	5,91	8,46	9,04	5,03	4,34	107,2
<i>Almonds peeled</i>	1191,5	765,6	1051,2	2033,5	2313,1	1276,9	677,7	2219,8	186,3
<i>Average price per kilogram, (kg / \$)</i>	5,35	5,78	5,87	13,56	13,64	8,92	6,03	4,06	75,9

In general, the change in export prices for nuts exported from the country can be clearly seen in Figure 2 below. That is, while export prices peaked in 2012 and 2015, they have been declining since 2016. If we pay attention to the analysis, we can see that the decline in the average market price of walnuts is typical not only for our country, but also for the average price of walnuts in the world market in recent years. However, according to experts, from January 2020 there will be a slight increase in world market prices for walnuts and other nuts.

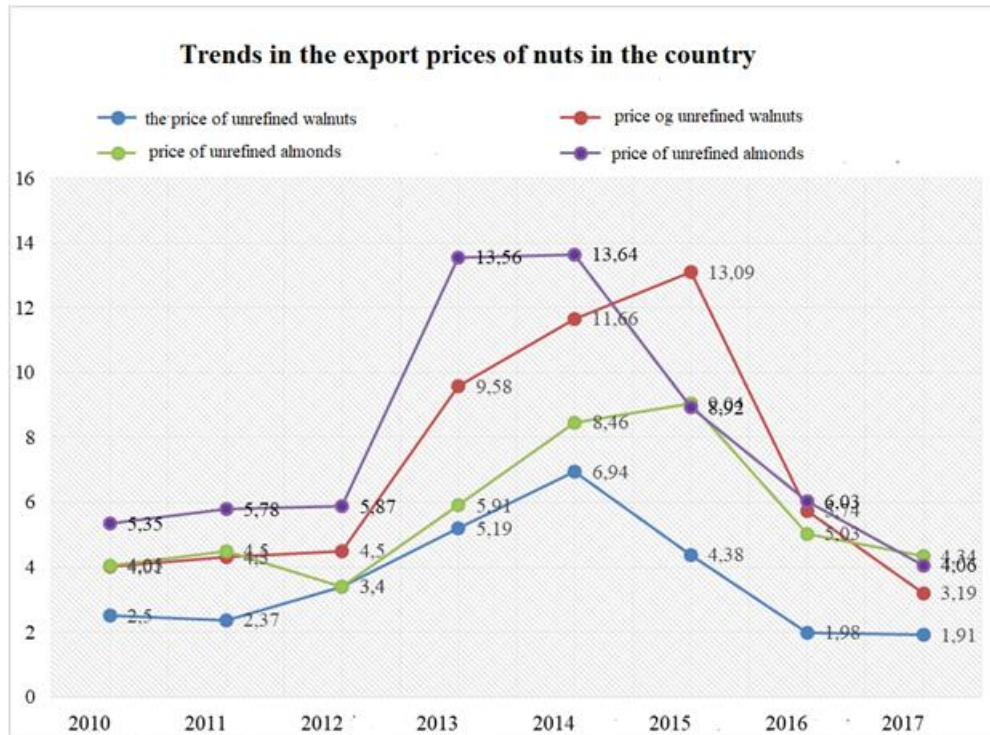


Figure 2. Trends in the export of walnuts and almonds in Uzbekistan

According to the EastFruit organization, an increase in the market price of walnuts can be seen. For example, in February-March 2019, the price of walnuts in Moldova, one of the nut-exporting countries, increased by 7% (to 4.37 kg / \$), and in Ukraine by 3% to 5.41 kg / \$. In Russia, meanwhile, the average price of a kilo of walnuts fell by 11 percent to 8.20 kg / \$ (Figure 3). In general, the average prices in neighboring countries, which grow walnuts and offer products to the market, are much higher than the prices in Uzbekistan, and only in Moldova and Ukraine the market prices are close to the average market prices of walnuts grown and exported in Uzbekistan. In this regard, experts note that the price of walnuts grown in our close neighbor, Tajikistan, is higher than in Uzbekistan due to the fact that Tajikistan is not one of the largest producers and exporters, and the country does not have new walnut plantations.

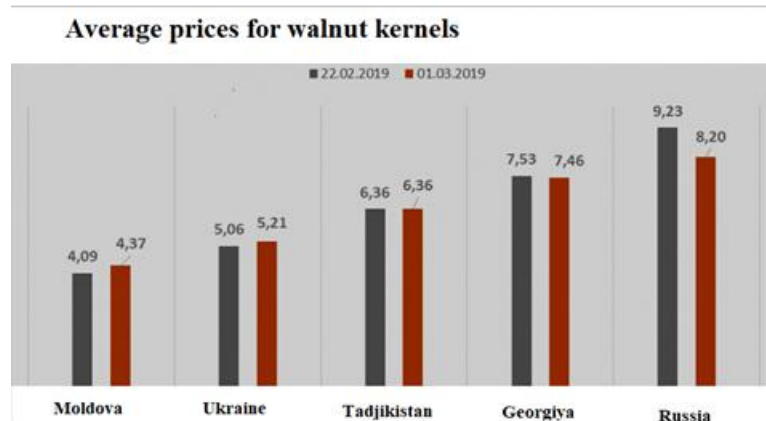


Figure 3. Changes in the price of walnuts (walnut kernels) in neighboring countries

As can be seen from Figure 3 above, the situation in the Russian Federation, where the market price of walnuts is the highest, is explained by the fact that the country's walnut production volumes are much lower than market demand. affects. One of the important factors in the increase in market prices for walnuts is also the direct contact of Russian walnut importers with foreign suppliers. In general, the main reason for the high market value of walnuts in the Russian Federation is the fact that due to the unfavorable climate for growing walnuts, the main place in the import of products as a result of non-cultivation of walnuts on plantations planted on an industrial basis. The opinions of many experts in this regard also prove this. Today, while the United States is

one of the countries with the greatest potential for growing and selling walnuts, Chile also has a very fast-growing opportunity to grow and export walnuts. In particular, in Chile in 2018, experts did not estimate the volume of walnut production to less than 100 thousand tons, and by 2025 this figure is expected to double.

Chile's growth in the global walnut market is projected to increase the area under walnuts in the country from 26,000 hectares to 42,000 hectares (161.5%) between 2011 and 2014, while production will increase from 53,000 tons to 100,000 tons. It is also noted that the yield of nuts is increasing. This is due to the fact that the walnut orchards being built in recent years are mainly of high quality, which means that by 2021 the production of walnuts will reach 166,000 tons (166% more than in 2014). Today, in Uzbekistan, as well as in all the countries of the former Soviet Union, which have existed for many years, the cultivation of walnuts is carried out mainly on the land of the population. This does not always ensure the quality of the walnut. For example, in Ukraine, which has a very favorable nature for growing walnuts and has an average annual production capacity of 90-120 thousand tons, and 86% of walnuts grown in Ukraine, one of the top five countries in the world in terms of walnut cultivation, are grown in residential areas. Only 14 percent are grown on walnut plantations of large walnut-growing businesses.

Based on the above considerations and the results of the analysis, the following conclusions can be drawn:

- At present, the cultivation of walnuts in Uzbekistan is carried out mainly on the lands of the population and occasionally planted wild walnuts or unsystematically planted varieties, which does not allow to ensure the quality of walnuts in accordance with world market requirements;
- The development of confectionery enterprises in Uzbekistan, as well as the fact that families have a tradition of making various pastries, increasing the consumption of walnuts at various weddings and ceremonies, indicates the development of the domestic walnut market and this situation ensures stable market demand;
- The stability of the supply of walnuts in the country, first of all, the volume of exports of walnuts by private entrepreneurs stimulates the growth of interest in the cultivation of walnuts on farms and dehqan farms, the state policy in the country, the expansion of walnut plantations;
- Although the production of walnuts in Uzbekistan has a long history, it is based primarily on peanuts and almonds, and the walnut market is still developing. This is because the requirements of the world market for commodity properties such as the quality, size, sprout and color of the kernel of walnuts are being assimilated by all nut-growing entities today;
- One of the main problems in increasing the volume of walnut production is the lack of knowledge about the agro-techniques of walnut cultivation, especially walnut diseases and pests, the lack of access to measures and means to combat them;
- There is a growing need to develop infrastructure for the cultivation, processing, marketing and marketing of quality walnuts, and, first of all, the establishment of a system of advisory farms, as well as the planting of high-quality walnuts;
- One of the urgent issues is to stimulate scientific research in the field of creating high-yielding varieties of coconut, the regions of the country are suitable for natural climatic conditions, able to produce products within the requirements of the world market;
- The influx of walnut seedlings of foreign selection into Uzbekistan, the future establishment of walnut plantations in low-water dry farming areas, the export of walnuts is a factor that will further increase our potential;
- Studies show that the formation of the market price of walnuts is based on the following factors - (i) walnuts are sold up to 50% more expensive than small nuts if the fruit is larger; (ii) nuts harvested in the previous year are sold at 30 per cent more expensive than freshly harvested nuts; (iii) peeled walnut kernels are sold at a higher price, which leads to faster quality deterioration and contamination than unpeeled, leading to a quality and relatively inexpensive packaging of 150-200 grams, which is convenient for consumers;
- Since the establishment of walnut plantations requires initial investment and the nut business will begin to return to the entrepreneur only after 5-7 years, it is important to allocate subsidies and introduce effective lending systems to stimulate the export of products;
- Although all the vegetative organs of walnuts can be widely used in various sectors of the economy, in our country only the fruits are used. And the fact that the valuable use of walnut wood by the population in most cases only the quality of wood shows that it is possible to master many directions in the development of the market of walnut products;
- In the framework of measures aimed at increasing the volume of walnut production in Uzbekistan, it is expedient to form the legal, organizational and economic basis for long-term lease of forest lands for growing walnuts under certain conditions. This, in turn, will protect the forest areas, increase the level of tree cover in the areas, and ensure the beneficial cooperation of the forest fund with private business.

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