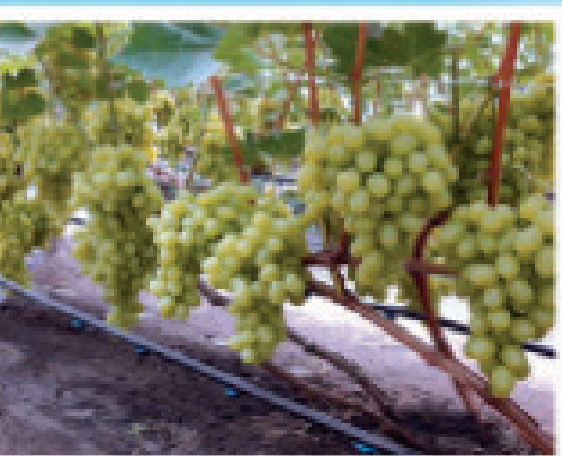


ISSN 2181-9408

Scientific and
technical journal

Sustainable Agriculture

Nº2(18).2023



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Our address: 39, Kari-Niyazi str., Tashkent 100000 Uzbekistan, [www. sa.tiame.uz](http://www.sa.tiame.uz)

The journal "Sustainable Agriculture" is registered in the Press Agency of Uzbekistan on the 12th of February in 2018 (license № 0957).

In 2019, the journal is included in the list of recommended scientific publications by the Higher Attestation Commission of the Republic of Uzbekistan.



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THE ROLE OF MARKET INFRASTRUCTURES IN THE DEVELOPMENT OF WALNUT PRODUCTION AND ITS SELLING SYSTEM

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Abstract

The article discusses the use of market infrastructures in the system of production and sale of walnuts in our country, walnut types and conditions affecting their effective use.

Introduction. In market conditions, as a result of an increase in the number and types of services of walnut producers and market entities providing them, the diversity of their forms of ownership, as well as an improvement in the competitive environment, are one of the important factors. However, according to studies, the market infrastructure serving nut producers is still in a monopoly position in terms of types of services and prices. In particular, the specialization of servicing commercial banks (distribution of networks between banks), the underdevelopment of the insurance market or their attachment to one agricultural insurance company, the formation of small groups of exporters, the formation of an attractive atmosphere for the creation of market infrastructure in this sector and the formation of entrepreneurs have a negative impact.

Materials and Methods. Based on the conducted research, it is possible to study the infrastructure of the market for growing and selling walnuts, conditionally dividing them into 2 groups. In particular (Fig. 1):

- to the subjects of market infrastructure inextricably linked with the cultivation of walnuts, we can include commercial banks, leasing companies, insurance companies, tax authorities, trade intermediary organizations, farmers' markets, microfinance organizations, consulting service centers, information and consulting firms, service LLCs real estate;

- agrilogistic centers, brokerage companies, legal services, engineering companies, labor offices, audit firms, design and estimate bureaus, outsourcing service organizations, non-state ones act as market infrastructure subjects, non-profit organizations, commodity exchanges not regularly involved in walnut growing activities.

However, there is another aspect of the issue, which is directly related to the possibilities of using market infrastructure and its economic potential by farmers who have a significant share in production. In other words, the possibilities of using these infrastructures by the population growing walnuts in mountain and foothill regions are limited due to the influence of objective and subjective factors.

Therefore, it is necessary to assess the state of use of the market infrastructure of each walnut farming entity, regardless of the form of management, and the role of these entities in their sustainable development. There are several methods for assessing the role of market infrastructure in the activities of nut producers, and they can be divided into 3 groups. Including:

- Method of direct study of the socio-economic situation. In this case, the main research method is questioning, which creates the basis not only for a face-to-face study of the production situation, but also other factors influencing it.

- Numerical analysis method. In this case, the situation can be analyzed based on available market infrastructure statistics and other verified information, which will be

effective in cases where formal or informal calls for hobbies are monitored.

- This is a generalized method according to which, based on the analysis of available figures, studies of social antecedents in selected areas are carried out. This method does not cover the entire infrastructure; on the contrary, research is carried out in the main areas identified as a result of monitoring, and allows the use of any survey method (face-to-face, remote).

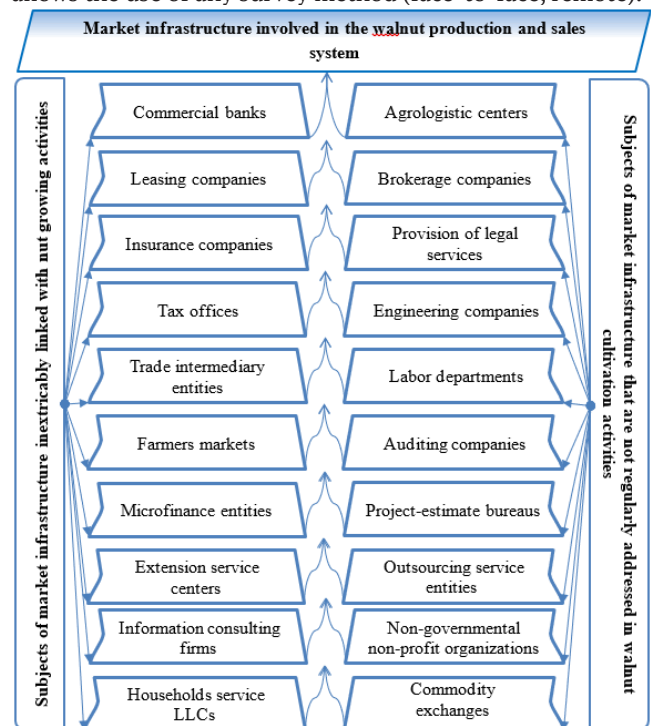


Figure 1. Market infrastructure involved in the walnut production and sale system.

Based on the above, if you study the situation with the use of market infrastructure in the cultivation and sale of walnuts, you will notice that it largely depends on the form of management. At the same time, a number of factors, such as production volume, annual income and harvest period, do not leave their influence on the use of market infrastructure by walnut producers (Fig. 2).

In particular, if the Farm is a legal entity (farmer or farm, LLC, etc.), it can work directly with the bank, tax office, retail stores and service providers on the basis of an agreement. If the farm is unregistered, the use of the facilities will change. Also, if the volume of walnuts grown on a farm is high, it can work directly with sales branches, logistics centers, sorting, packaging services, insurance, leasing companies, and if it is a small commercial farm, then it cooperates only with intermediaries.

If the farm is caring for walnuts, these are young seedlings, then the demand for the services of almost 70% of the market

infrastructure will not be formed during the first 5 years. Only banking (in case of a loan), insurance, chemical services and, in rare cases, consulting centers may be in demand. On the other hand, if income is low due to various factors in the nut industry, he prefers to organize work based on years of experience, mutual advice and traditional experience rather than market infrastructure services.

Discussion and results. In a broad sense, it reflects two integrated and interdependent processes for assessing the role of market infrastructure in increasing incomes through the development of nut production and marketing systems.

First of all, based on a detailed study of the production and sales processes, it is advisable to determine the demand and supply for certain types of services and, on the basis of this, locate or specialize infrastructure facilities.

Secondly, prices for services provided by market infrastructure should be determined independently based on supply and demand, and if services are not specifically priced at these prices, the government should use incentives to stimulate demand.

Therefore, in the future it is advisable to implement the following set of measures to expand the volume and quality of services provided by the market infrastructure of the nut industry. Including:

- implementation of measures of state financial support for the development of services that bring a small income to the service provider, but are necessary for the development of nut farms, including government grants, subsidies, the introduction of tax and credit benefits;
- organization of special courses regularly operating in regional educational institutions of mountain and foothill regions for the purpose of training and improving the qualifications of workers for the service sector;
- create clear and perfect organizational and legal framework for regulating the provision of services, including regulating the system of mutual settlements;
- along with regulating prices for the services of service enterprises that have a monopoly position, it is necessary to comprehensively implement measures to stimulate the development of walnut growers.

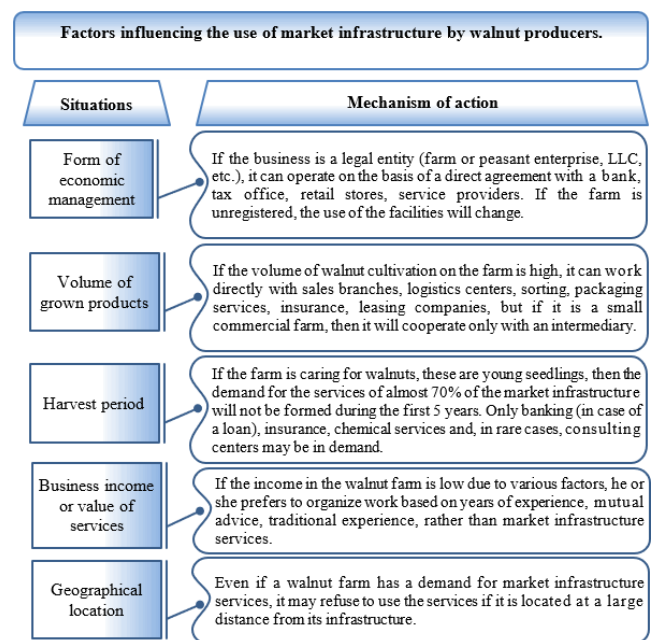


Figure 2. Factors influencing the use of market infrastructure by walnut producers.

Because increasing the solvency of walnut growers will indirectly stimulate the development of service sector enterprises and vice versa. Therefore, it is advisable to apply the practice of stratifying prices for services provided by service enterprises, introducing the principles of seasonality.

Conclusion. In particular, it is possible to set limits on price increases in favor of service sector enterprises during seasons of high demand for certain types of services and, conversely, during periods of low demand, it is possible to stimulate demand for services by reducing the price of services.

It will be possible to use measures of state financial support for the activities of mobile service groups in the activities of nut farms in mountain and foothill regions. In particular, it is advisable to subsidize part of the costs associated with the provision of services by service structures operating in relevant areas with difficult natural and climatic conditions, where social protection of the population is necessary.

The implementation of the listed measures, the development of a system for providing services by market infrastructure for the production of nuts in the republic and their effective sale, the formation of a healthy competitive environment in the industry, increasing the volume and quality of services, reducing prices will serve to generate additional income in the mountain and foothill areas.

References:

1. Construction and Infrastructure. <https://www.elginfasteners.com/industries-served/construction-infrastructure/>
2. Чернов С.Е. Маркетинговая деятельность сельскохозяйственного предприятия. М.: ТСХА, 1996. 65 с.
3. Ajiboe A.O the impact of transportation on agricultural production in a developing country: a case of kolanut production in Nigeria. Ladoke Akintola University of technology. International journal of agricultural Economics & rural development – 2 (2):2009.
4. Umurzakov O'.P., Djuraev.B. Agrosanoat majmuasida marketing tendensiyalari va rivojlanish istiqbollari // O'zbekiston qishloq xo'jaligi jurnali 2014 yil №8.
5. Resolution of the President of the Republic of Uzbekistan dated 01.06.2017 No PQ-3025 "On the establishment and organization of the Association of nut producers and exporters"
6. <https://learn.oracle.com/ols/module/oracle-cloud-infrastructure-nuts-and-bolts/43657/35759>