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THE IMPORTANCE OF RESOURCE EFFICIENCY IN ASSESSING THE POSSIBILITIES OF INCREASING WALNUT PRODUCTION USING INNOVATIVE TECHNOLOGIES

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Abstract

*In the future, it is desirable to develop directions for organizational and economic support for the development of the nut industry based on intensive technologies, as well as ways to improve it. It should be noted that support levers are effective among nut farms in the plains, mountains and foothills. This article reveals the importance of resource efficiency when assessing the possibilities of increasing walnut production using innovative technologies.**Key words:** single-sprinkler, radial curves, spray losses, evaporation losses, semi-portable sprinkler.*

Keywords: *walnut production, innovative technologies, resource saving conditions, irrigation of walnut groves, application of mineral and local fertilizers, etc.*

Introduction. The role and importance of the agricultural sector in ensuring food security of the population on a global scale is increasing every day. In particular, the issue of using the resources and opportunities available in our country to ensure a guaranteed supply of agricultural products to the population, further increasing productivity and interest, introducing scientific achievements and modern approaches in the field is relevant.

President Shavkat Mirziyoyev, in his address to the Oliy Majlis on December 29, 2020, especially emphasized that the factor that gives the most rapid results in reducing poverty and increasing the incomes of rural residents is a sharp increase in productivity and efficiency in agriculture [1].

In this process, it was prioritized to increase the income per hectare of land from the current average of $2,000 to at least $5,000, and it was also determined that we should widely implement the most advanced technologies, water conservation and biotechnology. , achievements in the field of seed production, science and innovation in agriculture.

Decrees of the President of the Republic of Uzbekistan dated January 28, 2020 № PD-4575 "On measures to implement the tasks set in the Agricultural Development Strategy of the Republic of Uzbekistan for 2020-2030"[2] and №. PD-3025 June 1, 2017 "Nut producers and exports to decisions on the creation of the Farmers Association and the organization of its activities, stimulate and further improve the efficiency of use of drylands, increase the production of walnuts that are competitive in the domestic and foreign markets, create modern walnut orchards by attracting foreign investment in the industry and establish scientific cultivation of walnuts nut Particular attention is paid to the widespread introduction of basic methods and innovative technologies.

Materials and methods. According to research, the following circumstances lead to the need to develop the nut industry through the effective use of nut plantations, the introduction of new forms of agricultural entrepreneurship in the regions, carrying out consistent reforms in the nut industry, and increasing labor productivity. volume of walnut cultivation (Figure 1). Including:

- efficient use of agricultural resources, especially walnut groves, is becoming important in the context of the development of innovative technologies;
- the fact that the world's population is increasingly increasing, the issue of providing it with high-quality and safe food products is considered as one of the most important tasks;
- increasing demand for nuts and nut products in the domestic and foreign markets;
- efforts of estate owners to effectively use their estates and create an additional source of income;
- organization of agricultural clusters, diversification of production, possibility of supplying investors and consumers with high-quality and medical products;
- industrial development is important in ensuring employment of the population;
- the possibility of growing vitamin-rich, high-calorie products for the country's population and the need to grow products that are as beneficial as possible for the population's immunity;
- due to external factors, the situation in neighboring countries, interruptions in fruit imports due to pandemic complications;

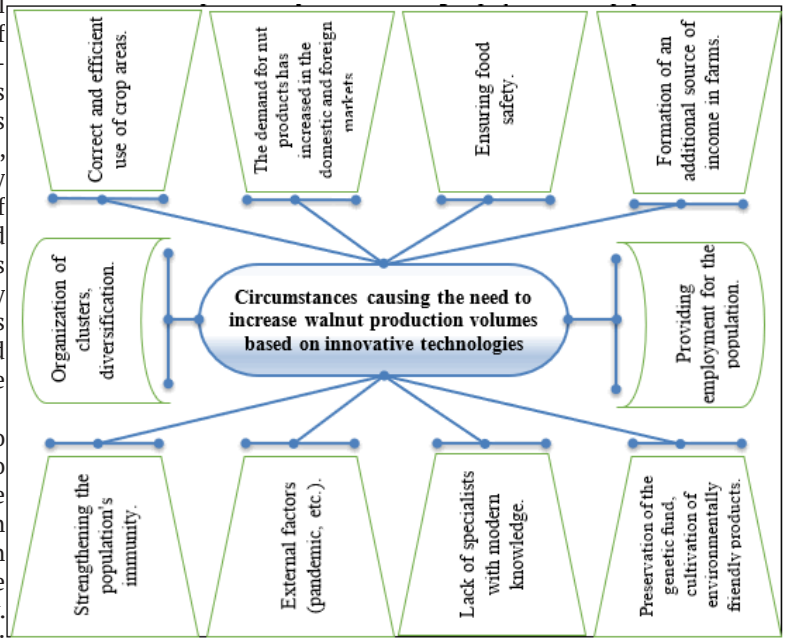

Figure 1. The main circumstances causing the need to increase the production of walnuts in our country [8].

- formation of modern knowledge on the use of innovative technologies and techniques, their development;

- Strive to produce environmentally friendly products without GMOs, preserve the genetic fund of local seedlings, etc.

Therefore, based on the above existing circumstances, we can say that today it is important to assess the possibilities of developing walnut production and increasing the volume of walnut production. For this, first of all, one of the necessary areas is the efficient use of resources. At this stage, we think about the importance of resource conservation when assessing the possibilities of increasing walnut production volumes using innovative technologies.

The development of walnut growing in our country and the emergence of walnut plantations causes an increase in diseases of nut trees and insects. For example, widespread diseases of walnuts include “White spots” (Microstroma juglandis Sacc fungus), “Grey spots” or marsoniosis (Marssonina juglandis fungus), which destroys up to 50% of the walnut crop, causing great economic damage [3].

One of the most terrible diseases of walnuts is bacteriosis (Xanthomonas campestris px juglandis), it severely damages all organs of the tree, especially during flowering, up to 90 percent of the crop dies, and the tree remains practically unproductive [4].

Therefore, it is important to provide methods and means of plant protection when growing walnuts and increase the economic efficiency of production. At the same time, measures to protect crops should be carried out using resource-saving methods and means. Resource efficiency in agriculture is very relevant today, and its importance is increasingly increasing. As the quantity and quality of agricultural inputs decline, quality inputs become more expensive. Resource Scarcity Although the need for resource conservation varies from region to region, a common commonality is resource scarcity.

Research methodology and analysis. In our opinion, economic activities when growing walnuts on peasant farms are carried out within the framework of the following resources (Fig. 2):

Labor is at the disposal of the farms. It consists primarily of employees hired on a temporary basis under employment contracts, who may not have structurally relevant skills. Labor is hired for a short period of time due to the use of predominantly family labor in peasant farms. In particular, there is a need for a short-term hired worker on farms during the period of nut tree formation and harvesting.

Financial resources available to farmers. These resources are mainly financial resources aimed at reorganizing walnut production (simple reproduction), developing production (expanded reproduction), fulfilling the financial obligations of walnut producers to various economic entities, and paying wages. Financial resources consist of profits and financial resources involved in the performance of agricultural holdings.

Production assets owned by farms. Means of labor involved in the production process (trees, agricultural machines, vehicles, technological equipment associated with storage and processing of products, equipment for caring for trees during the growth period), means of labor in their place are objects of labor (land and water, seedlings , fertilizers, chemicals, petroleum products, etc.), together with them constitute the means of production. In this case, saving water resources and the consumption of chemicals are economically and environmentally significant.

Intangible resources available to farmers. Intangible resources include experience in farming, patented developments, methods of processing trees, funds spent on acquiring new knowledge, trademarks, rights to use agricultural land. However, the consumption of these resources does not contribute significantly to the cost of the product.

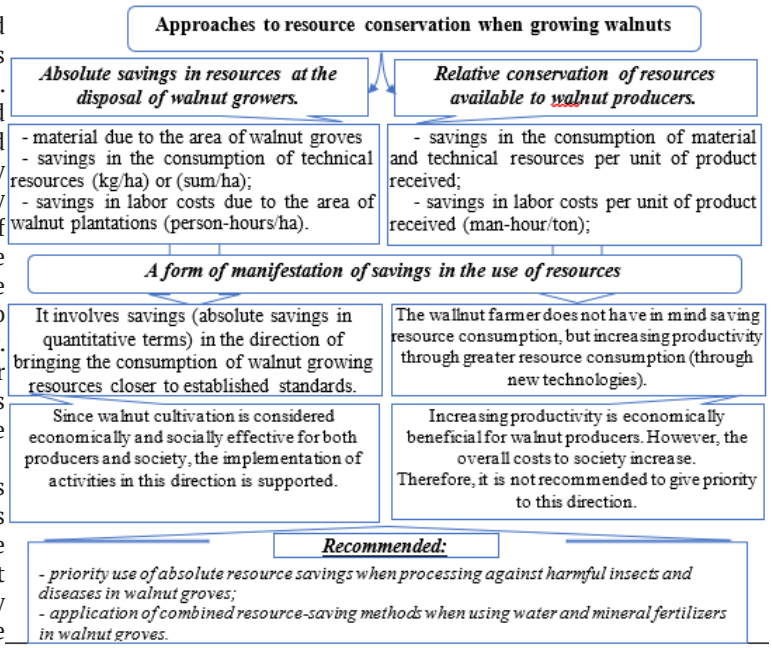

Figure 3. Approaches to resource efficiency of walnut production on farms [5].

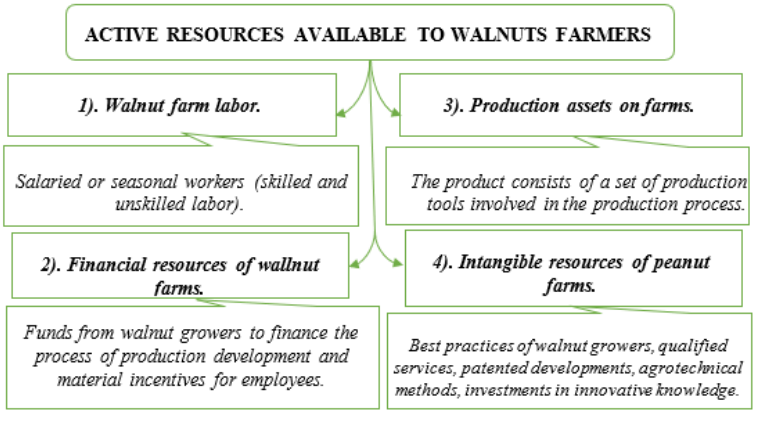

Figure 2. The resources used in the lean system are at the disposal of the walnut farms [5, 8].

The basis of the economy is the high-quality and timely implementation of agrotechnical measures due to the least consumption of resources due to the area of walnut groves or one walnut tree. In this case, the introduction of an irrigation system, fertilizing or insect and disease control methods developed on the basis of farm experience can provide absolute and relative cost reductions. It is necessary to pay attention to the issue of absolute and relative savings of resources (Figure 3).

Therefore, when carrying out agrotechnical measures in walnut plantations within the framework of resource-saving measures, the directions “absolute resource conservation” and “relative resource conservation” can be adopted. At the same

time, in the first direction, resource savings per unit area of nuts are monitored, with an assessment of savings measures relative to existing resource consumption rates or indicators of previous years.

In the second case, the analysis of resource consumption is carried out not on the basis of the area of nut plantations, but on the basis of a unit of grown products. Other aspects may also be taken into account. For example, chemicals used against pests and diseases, or excessive use of water to prevent crop losses may be effective, but environmental problems are harmful to society. Therefore, it is recommended to use absolute resource savings as a priority. It is also advisable to look for the possibility of integrated use of both directions when assessing savings.

The task of resource saving for peanut farms requires solving a number of organizational, economic and technological issues regarding the use of each resource used in production. In particular, the issue of absolute savings or relative savings in the use of available resources requires the following conditions to be met (Fig. 4).

In order to economically use the labor force at the disposal of farmers as a resource, it is necessary to create the following conditions:

- effective use of new economical technology and technological equipment, developing economic skills among workers by improving the qualifications of workers hired under seasonal employment contracts or by oral agreement in walnut growing enterprises (through seasonal practical seminars);
- organizing traveling exhibitions aimed at mastering industry best practices in order to improve the knowledge and skills of workers hired under employment contracts on a seasonal basis;
- material incentives for seasonal workers, implementation of measures aimed at increasing labor productivity and product quality through the formation of a system of social packages.

The conditions recommended above create conditions that create an economic incentive to increase labor productivity and improve the quality of products through the efficient use of labor in nut farms.

For the economical use of production assets of nut-bearing farms, the following conditions are necessary:

- replacement of the funds at the disposal of the economy with effective methods that allow saving by updating the structure;
- implementation of measures to optimize the amount of equipment and mineral fertilizers, which have a large weight in the structure of product costs;

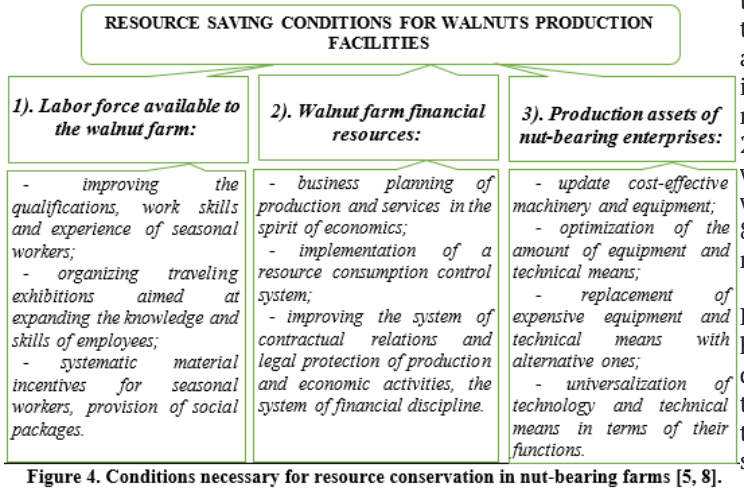

Figure 4. Conditions necessary for resource conservation in nut-bearing farms [5, 8].

- it is possible to reduce equipment costs per unit of land through the use of universal equipment.

Discussion and results. The conditions for the economical use of financial resources of nut-bearing farms are as follows:

- reduction of excess costs during the growing season based on economic planning of the production area in commercial nut-bearing farms and the introduction of a business plan control system;
- based on improving relations (written or oral agreements) with suppliers and buyers of resources, it is necessary to save financial resources by introducing a system of discipline associated with the timely execution of payments for products sold.

The main activities for growing walnuts (in relation to existing walnut groves) include the following (Figure 5):

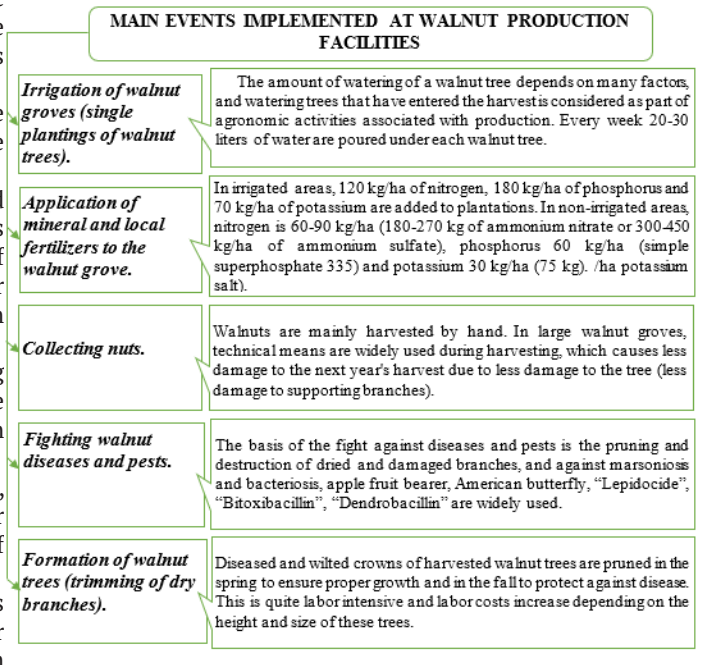

Figure 5. The main activities carried out in the walnut industry participate in the economic system [8].

Irrigation of walnut groves (single plantings of walnut trees). Typically, the irrigation regime and rate depend on many factors, the main of which are the full harvest of the walnut tree, the mechanical composition of the soil of the walnut groves, the groundwater level, the onset of the dry or rainy season and air temperature.

Water and labor consumption when watering walnut trees depends on many factors, and irrigating trees that have entered harvest is considered part of the activities associated with production. Also, if we take into account that walnut trees are grown in the republic mainly on farms, without forming single tracts, then 20-30 liters of water are poured under each walnut tree weekly. Experts have found that the walnut tree grows well in the republic on slopes with a rainfall of at least 800 mm. Walnuts growing on the banks of mountain rivers are usually watered once or twice a year.

On farms, walnuts are mainly harvested by hand. However, in modern walnut groves (plantations), harvesting is carried out using technical means and, due to less damage to the tree, causes less damage to the next year's harvest (less damage to the branches of the crop) [6]. According to the results of monographic studies, depending on the size of the walnut tree

(mostly wild), harvesting a large single planted walnut tree in one work shift requires 0.7–0.9 people, and this is a labor-intensive process.

The basis of the fight against diseases and pests of the walnut tree is the pruning and destruction of dried, damaged branches, and toxic pesticides (such as Lepidocide, Bitoxibacillin) are widely used [7].

Conclusion and recommendations. The diseased and dead branches of the harvested walnut tree are believed to grow properly to increase productivity. The process is very labor intensive and labor costs vary depending on the height and size of the trees. This process, along with painstaking work, also requires professional skills. Because improperly cut branches and branches can reduce next year's harvest and cause significant damage to the farm.

Taking into account the above, in a methodological approach to the issue of assessing resource efficiency within the framework of the main activities used in walnut cultivation, the following is recommended:

- the selected agricultural technology should be widely used in growing products in most nut-bearing farms and other nut-bearing farms;
- costs associated with the implementation of selected from the main activities used for growing walnuts should have a significant weight (the largest) in the cost of production;
- there must be an alternative option for carrying out activities used in walnut growing.

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