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FACTORS AFFECTING THE PRODUCTIVITY OF FRUIT GROWING ON FARMS

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Annotation
The article is based on data from farms specializing in horticulture. Factors affecting horticultural productivity relate to linear, mixed (combined), logarithmic and semi-logarithmic econometric models, optimally isolated and analyzed among the found models.

Keywords: econometrics, linear, edaphic, multicollinearity

Introduction

It is necessary to accelerate the development of all sectors of agriculture in the country, including fruit and viticulture, increase soil fertility, increase fruit and grape yields, improve product quality and keep them in the off-season to fully meet the demand of our people for fruit and grape products.

According to research, the main agricultural products of the Samarkand region in recent years in 2019 decreased by 0.6% compared to 2010 and amounted to 756.0 thousand tons, while potato production was 67.5% (622.6 thousand tons). vegetables increased by 51.0% (1584.8 thousand tons), fruits and berries by 44.5% (334.8 thousand tons) and grapes by 56.8% (564.4 thousand tons).

In the Samarkand region today (2019) the area of fruits and berries is 41.1 thousand hectares, of which 14.3% (5.8 thousand hectares) in Bulungur district, 8.3% (3.4 thousand hectares) in Jambay district, 17.1% (7.0 thousand ha) Samarkand, 12.5% (5.2 thousand ha) Nurabad, 7.5% (3.1 thousand ha) Pasdargom and 7.1% (2.9 thousand ha) Concentrated in Urgut districts.

Horticulture is also widely developed in Akdarya (2.1 thousand hectares), Kattakurgan (1.8 thousand hectares), Payarik (2.6 thousand hectares) and Ishtikhon (1.2 thousand hectares) districts of the region[1, p. 280].

The analysis shows that the following factors play an important role in ensuring the innovative development of horticulture: productivity of orchards, quality of

products, cost of production, the number of products grown per unit of labour, geographical location of horticultural areas, favourable economic and natural conditions, as well as specialized farmers area of orchards on farms, specialization of production processes and innovation of the industry.

The future efficiency of fruit production in the region's horticulture is largely determined by the development of the fruit processing industry following the requirements of a market economy.

Accelerated development of fruit production in the country requires an increase in soil fertility, increasing the productivity of orchards, the production of high-quality, competitive and high-quality products.

Today, horticulture is one of the priorities of the agro-industrial complex of the Samarkand region. There are favourable natural and climatic conditions, sufficient labour resources, experience and traditions of the local population to produce competitive products. Many areas have unique soil and climatic conditions for industrial gardening. Based on the above, the study of factors affecting fruit yield in the integrated development of horticulture in the regions remains one of the important tasks.

In recent years, it has been studied by several researchers on agricultural reform and the introduction of market mechanisms in the industry, further development of the fruit and vegetable and viticulture sector, the creation of a value chain in the industry. Most of the economic and statistical analysis of the activities of farms specializing in fruit and vegetables in agriculture is based on factors affecting the yield per 1 hectare of fruit and vegetable farms in terms of time and multi-factor functions The level of supply, mechanization and chemical treatment was considered and the factors influencing the increase in productivity were found to depend on water supply, mechanization and chemical means [3,p.12].

Many researchers consider the edaphic factor in the production of agricultural products as a key factor influencing the increase in productivity in the cultivation of horticultural products. Most of the research in this area shows that the average score bonet of soil, as well as chemical agents, is one of the important factors.

In the cultivation of agricultural products, as a result of insufficient supply of mineral fertilizers promptly and the continuous absorption of nutrients by plants from the soil, there are cases of reduction of phosphorus, potassium and trace elements in the soil. Therefore, it is necessary to carry out agrochemical inspections of the soil in each crop area.

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The published results show that ensuring food security in our country, the production of quality and environmentally friendly products for the population is one of the most pressing tasks today. At the same time, effective protection of orchards from pests and other agro-technical measures are carried out. In orchards are mainly dangerous pests (apple orchards, oriental orchards, aphids, moths, shrubs, etc.), there are more than 200 species in orchards, which damage the crop by 70-80% [2, p. 29].

The results show that a comprehensive study of the factors affecting horticulture to increase productivity and find answers to them was conducted.

Methods and Materials

As an object of research, farms specializing in horticulture were obtained. The subject of research is the application and effective use of the methodology of modelling the factors affecting productivity in specialized farms, production. The study used statistical observation, grouping, descriptive system analysis, and econometric modelling methods.

One of the most important features in the development of the economy is the importance of determining the impact of factor indicators on the performance of a particular industry.

This article examines the factors influencing productivity in horticulture using group data for 2017-2019.

The study included organic and mineral fertilizers used in horticulture, irrigation water, as well as temperature, precipitation, relative humidity, soil fertility (score quality), pest chemicals, labour costs, and average total costs per hectare of land. the effect of factors was studied. The variables classified in the econometric model are the amount of organic fertilizer applied to 1 hectare of garden area, mineral fertilizer, water used, air temperature, precipitation, relative humidity, soil fertility (score quality), pest chemical consumption, labour cost and average per hectare of land. The following econometric model of the total cost was used:

$$PRODUC_i = a_0 + a_1 ORG\_FERTIL_i + a_2 MIN\_FERTIL_i + a_3 WATER\_SUP_i + a_4 TEMPERATURE_i + a_5 PRECIPITAT_i + a_6 HUMIDITY_i + a_7 SOIL\_QUAL_i + a_8 PESTIC_i + a_9 LABOR_i + a_{10} AVER\_COST_i + \varepsilon$$

Panel data consists of observations of the same economic units or objects, which are performed in successive periods. Panel data combines both cross-sectional data and time series data: there is spatial data on economic units at each instant of time, and the corresponding data for each object constitute one or more time-

series. Due to its special structure, panel data allows you to create more flexible and meaningful models. In particular, it will be possible to account for and analyze individual differences between economic units, which cannot be done within standard regression models. When analyzing group data using the Fixed Effect model, the explanatory variables are considered random. The term "sustainable impact assessment function" is used to define an estimate in the regression model parameters. The sustainability model is typically used to analyze the degree of exposure to various parameters. This method studies the negative relationship between the independent variables given in the same units of measurement and the resulting data. The general view of the Random Effect model is based on the assumption that differences between farms are random and not related to the independent variables used in the model.

Several tests recommended by regression probabilities and empirical econometric literature were tested to select the best factors influencing productivity in horticulture [4, p. 746]. The correct selection of the influencing factors can be explained by the increase in the coefficient of determinism due to the addition of each factor. Fisher's F criterion is used to test the significance of the multivariate regression model. It is determined by the following formula: $F_{cal} = \frac{R^2(n-k-1)}{(1-R^2)k}$, (where $n-$ is the number of observations, $k-$ is the number of factors). If the calculated value of the criterion with the degree of freedom $\gamma_1 = k$, $\gamma_2 = n - k - 1$ at a given level of significance is greater than the value in the table, the model is considered significant without $F_{cal} > F_{tab}$. The observations revealed the significance of all models.

Results and Discussions

The main purpose of regression analysis is to distinguish the relationship between each independent and related variable. The regression coefficient evaluates the average change in the resulting factor for each change in the influencing factor and determines the degree of exposure to each influencing factor. It is therefore important to test multicollinearity.

The structure of the relationship between the factors is important in the analysis of the relationship. It is known that the measurement of the relationship between factors is calculated by the correlation coefficient. Analysis of the matrix of correlation coefficients allows to determine the characterization of free variables with the highest correlation with the outcome factor, as well as to obtain some

information about multicollinearity problems [5, p. 427]. Multicollinearity can be eliminated by removing one or more linearly linked factors from the correlation model or by converting the initial factors into new magnified factors. The question of which of the factors to exclude is decided based on qualitative and logical analysis of the studied phenomenon. The analysis of the whole test showed that the correlation between the factors influencing horticultural yield and the level of mineral fertilizers and water supply was 0.6031. When the relationship between these two factors to the outcome factor was examined, mineral fertilizer 0.7248 and water supply 0.6704 were excluded from the model due to the low correlation between water supply and organic fertilizer, precipitation, relative humidity and the average cost per hectare. It showed a high correlation between mineral fertilizer, temperature, soil fertility (score quality), pest chemicals, and the average cost per hectare of land, which had the highest correlation with yield.

A correlation matrix representing the relationship between variables[1]

Ўзгарувчилар	(1)	(2)	(3)	(4)	(5)
min_fertil	0.653* (23.19)	0.533* (18.07)	0.411* (14.9)	0.309* (11.66)	0.263* (10.45)
Temperature		2.397* (8.77)	1.459* (5.84)	1.109* (4.89)	0.976* (4.62)
soil_qual			1.522* (12.45)	1.253* (11.12)	1.118* (10.56)
pestic				1.649* (10.76)	1.545* (10.81)
aver_cost					1.079* (8.79)
a_0	37.603	0.7314	-43.334	-29.027	-16.307
R^2	0.5254	0.5903	0.6897	0.7497	0.7842
F	537.93	349.42	358.57	362.37	351.01

* $p < 0.05$

An overview of the calculated regression equation was as follows:

$$PRODUC_i = -16{,}307 + 0{,}263MIN\_FERTIL_i + 0{,}976TEMPERATURE_i + 1{,}119SOIL\_QUAL_i + 1{,}545PESTIC_i + 1{,}079AVER\_COST_i$$

Among the variables with high dependence on productivity, the linearity means that the yield per unit of mineral fertilizer is 0.263, the air temperature is 0.976 per unit, the soil fertility is 1.118 per unit, the insecticide is 1.545 per hectare, and the cost per hectare. Increase, in turn, leads to an increase in yield of 1,079 quintals.

[1] Author's development based on the program STATA

During the study, the regression equation was calculated in other forms, including:

-combined model

$$\ln\_PRODUC_i = 2{,}344 + 0{,}297\ln\_MIN\_FERTIL_i + 0{,}0057\ TEMPERATURE_i + 0{,}0079SOIL\_QUAL_i + 0{,}154\ln\_PESTIC_i + 0{,}063\ln\_AVER\_COST_i$$

-logarithmic model

$$\ln\_PRODUC_i = 3{,}908 + 0{,}0015MIN\_FERTIL_i + 0{,}007TEMPERATURE_i + 0{,}008SOIL\_QUAL_i + 0{,}0095PESTIC_i + 0{,}007AVER\_COST_i$$

-semi-logarithmic model

$$PRODUC_i = -279.624 + 50{,}932\ln\_MIN\_FERTIL_i + 0{,}861272TEMPERATURE_i + 1{,}153SOIL\_QUAL_i + 22{,}85\ln\_PESTIC_i + 9{,}954\ln\_AVER\_COST_i$$

Since the units of measurement of the factors affecting productivity are different, their coefficients of elasticity were calculated, and the linear regression equation was found to be the most optimal when analyzing the determinant coefficients of each regression equation.

The use of the econometric model in the analysis of available resources and natural and climatic conditions in the cultivation of agricultural products gives good results.

In addition, a distinctive feature of fruit growing is the fact that perennial seedlings are associated with environmental conditions. Each agro-climatic zone should have nurseries, depending on the climatic conditions of the region, each with its varieties, as well as trees in high demand among the population, stunted, semi-stunted and medium-height vegetatively propagated stocks, high-intensity varieties with high use of high-performance varieties. creation and introduction of garden plots into production; development of new technologies for fruit growing; industrial technologies need to be introduced to accelerate the growth of healthy planting.

Placement of seedlings in optimal climatic conditions; introduction of soil systems, provision of mineral nutrients and moisture; introduction of an integrated system of protection against pests and diseases; timely planting of seedlings, as well as comprehensive mechanization of production, storage and processing of fruit products; development of vehicles, road network; creating a modern base for fruit storage and processing; market infrastructure development. We believe that such factors are the factors influencing the efficiency of the horticultural sector, and taking them into account will serve to ensure the innovative development of the industry.

Considering the weather based on monitoring the development of pests and the functional state of plants, it is advisable to introduce an ecologically clean system to protect trees from abiotic and biotic stresses.

In summary, four types of regression models have been developed to study the impact of resource and natural-climatic conditions on fruit yield. These four models show that the factors affecting fruit yield in the Aqdarya district are: the amount of mineral fertilizer per hectare of garden area, temperature, soil fertility (score quality), pesticides, and the average cost per hectare of land.

Soil fertility has a strong impact on the yield of fruits grown on farms of the district. It is, in turn, indicates the need to achieve the maximum productivity potential of agricultural lands. To do this, it is necessary to increase soil fertility by preventing the degradation of agricultural lands and sharply reducing it.

References

1.Акбаров Ҳ.Ў. Боғдорчилик ҳосилдорлигини оширишга таъсир этувчи омилларни аниқлаш усулларини такомиллаштириш. “DEVELOPMENT ISSUES OF INNOVATIVE ECONOMY IN THE AGRICULTURAL SECTOR” International scientific-practical conference on March 25-26, 2021. Samarkand. SBTSUE. 280-284 p.

2.М. Муминов. Д. Обиджанов Олма ҳосилини олма мевахўридан ҳимоялаш усуллари. Ўзбекистон Республикаси Фанлар Академияси минтақавий бўлими хоразм маъмун академияси. Хоразм маъмун академияси ахборотномаси. 2020 й. 28-30 б.

3.Хожаев Азизхон Саидалохонович. Мева-сабзавотчиликка ихтисослашган фермер хўжаликлари фаолиятининг иқтисодий-статистик таҳлили (Фарғона вилояти мисолида). Автореферат. Тошкент – 2019

4. Gujarati, Damodar N. BASIC ECONOMETRICS. Fifth Edition. 2013. 946 p.

5. William H. Greene. Econometric analysis. Eighth edition. The Stern School of Business New York University. 2018 y. 1168 p.