EPRA International Journal of Economic Growth and Environmental Issues- Peer Reviewed Journal
ISSN: 2321-6247
Volume: 8| Issue: 2| September 2020 | Journal DOI : 10.36713/epra0713 | SJIF Impact Factor (2020): 8.007

ECONOMETRIC MODELS OF USING PRODUCTION FACTORS AND ESTIMATING THEIR EFFICIENCY

Barna Rakhmankulova[1]
[1]Candidate of Economics sciences, Associate Professor of the Department "Information Technology", Tashkent Institute of Irrigation and Agricultural Mechanization Engineers(TIIAME), Tashkent city, Uzbekistan.

Gulnoz Abdikayimova[2]
[2]Senior teacher of the Department "High Mathematics",
Tashkent Technical State University named after Islom Karimov(TTSU),Tashkent, Uzbekistan.

Dilnoza Saparova[3]
[3]Student of the faculty of Land Management Tashkent Institute of Irrigation and Agricultural Mechanization Engineers (TIIAME), Tashkent city, Uzbekistan.

ABSTRACT

This article considers that when analyzing the influence of production factors on cotton yield, it is necessary to determine the quantitative value of the influence of each factor separately, taking into account the influence of the entire set of factors. The solution to this problem is achieved by constructing one-factor and multivariate models of cotton yield by methods of correlation and regression analyzes.

KEYWORDS: ***agriculture, economic efficiency, productivity, influence of factors, correlation coefficient, regression statistics, linear dependence, correlation and regression analysis, one-factor, multivariate econometric model.***

INTRODUCTION

It is important to analyze the differences in the economic efficiency of agricultural enterprises in different organizational and legal forms. The necessity for this will increase with the emergence of such tasks as the deepening financial crisis of agricultural enterprises, the accumulation of debts and the massive restructuring of agricultural enterprises of agricultural policy.

Each event and process is interconnected in society, and connections are reflected in the interconnection of indicators that describe events and processes.

In this regard, the Strategy of Action for the Five Priority Areas of Development of the Republic of Uzbekistan for 2017-2021, approved by the Decree of the President of the Republic of Uzbekistan, defines the problem of further expanding the infrastructure of modern market services in the process of modernization and accelerated development of agriculture. efficient use of fertilizers and other agrochemicals and means of mechanization; improve technology management; be able to choose a profitable level of mechanization; positive changes in the specialization of the management system, sometimes transforming large farms into smaller ones; improve the provision of material and technical base and loans; improve product service and processing; to increase the share of agricultural producers in market prices; further improvement of storage, transportation and reclamation of irrigated lands, improvement of the condition of drainage and irrigation networks; depends on reforms in the agrarian policy of the state. Determination and measurement of these correlations is one of the important tasks of statistics.

METHODS AND MATERIALS

From year to year, it is becoming increasingly difficult for farmers to achieve profitable levels of cotton production. Even the long-term experience of farmers in achieving high productivity does not allow this to happen.

The problem of high cotton yields must now be tackled not only based on the diligence and enthusiasm of farmers, but also by increasing land productivity, efficiently using production factors and

EPRA International Journal of Economic Growth and Environmental Issues- Peer Reviewed Journal
ISSN: 2321-6247
Volume: 8| Issue: 2| September 2020 | Journal DOI : 10.36713/epra0713 | SJIF Impact Factor (2020): 8.007

introducing science-based crop rotation schemes based on soil types and salinity.

In addition, an important factor in increasing cotton yields is the timely and high-quality implementation of all necessary agricultural work on the basis of a system of cotton machines.

At the same time, it is necessary to introduce the necessary standards for the use of mineral and organic fertilizers and toxic chemicals to increase cotton yields. However, the exploitation of these important productivity factors is limited by skyrocketing prices for machinery, fuels and lubricants, fertilizers and toxic chemicals.

The rise in the cost of means of production forces agricultural producers to use simple technologies, mainly manual labor. As a result, labor costs for the production of one ton of raw cotton in cotton farms will amount to 506.3 man-hours this year. Let that figure be 584.5 man-hours next year. Or the increase in labor costs over this period will be 15.5%. Such labor costs for growing 1 ton of raw cotton are too high. According to the technological maps, labor costs for the production of 1 ton of raw cotton for the worst production conditions in Uzbekistan as a whole are only 455 man-hours. Conditions for growing cotton are not the worst in Uzbekistan, but labor costs are currently very high.

It is known that the influence of factors that determine the growth of cotton yields are interrelated, and they cannot be considered as a simple sum of isolated influences. Therefore, when analyzing the influence of production factors on cotton yield, it is necessary to determine the quantitative value of the influence of each factor separately, taking into account the influence of the entire set of factors.

RESULTS AND DISCUSSIONS

The problem is solved by creating one-factor and multi-factor econometric models of cotton yield using methods of correlation and regression analysis. The correlation coefficient is used as a measure of the degree of linearity. According to the formula for the correlation coefficient, the value of the correlation coefficient does not depend on the size of two variables, therefore this value is called a dimensionless quantity. Its value ranges from -1 to +1. Takes the value -1 for linear negative correlation and +1 for linear positive correlation. A value close to 0 for a correlation coefficient indicates no correlation between the variables.

To study this issue, long-term statistical data of the cotton industry of the Urtachirchik district of the Tashkent region were obtained. On their basis, a multivariate and one-factor regression analysis model was developed. Its methodological substantiation is given in.

The multivariate econometric model of cotton yield (Y) includes the following factors: X_1 - average land assessment, bonitet points; X_2 - the volume of applied mineral fertilizers, c.d.w. / ha; X_3 - labor costs, man-hour / ha; X_4 - wages, sum/ha. The problem was solved using a linear model. As a result, the following regression equation was obtained:

$$Y = 17,7 + 0,18x_1 + 0,73x_2 - 0,035x_3 + 0,02x_4$$

here, Y is the yield of cotton, centners/.

In the model, the multiple correlation coefficient (R) is 0.78, which indicates that all the selected factors are closely related to the effective trait. If the soil quality indicator (x_1) increases by 1, the cotton yield may increase by 0.18 centners, and if the amount of mineral fertilizers (x_2) increases by 1 centner, the cotton yield may increase by 0.3 centners. In this model, an increase in the cost of manual labor (x_3) negatively affects an increase in cotton yields, while an increase in wages (x_4) has a positive effect. In general, all the factors chosen in the model are related to cotton yield. This is confirmed by the value of the coefficient of determination (D = 0.425), which leads to the following conclusion: the change in cotton yield by about 42.5% is due to the influence of the studied factors. It should be borne in mind that modern software packages allow studying multicollinearity and identifying many factors that are functionally interrelated.

In our opinion, it is worth studying the dependence of the cotton yield on the amount of wages. The higher the hourly wages, the more workers are interested in more efficient and quality work and the higher the cotton harvest.

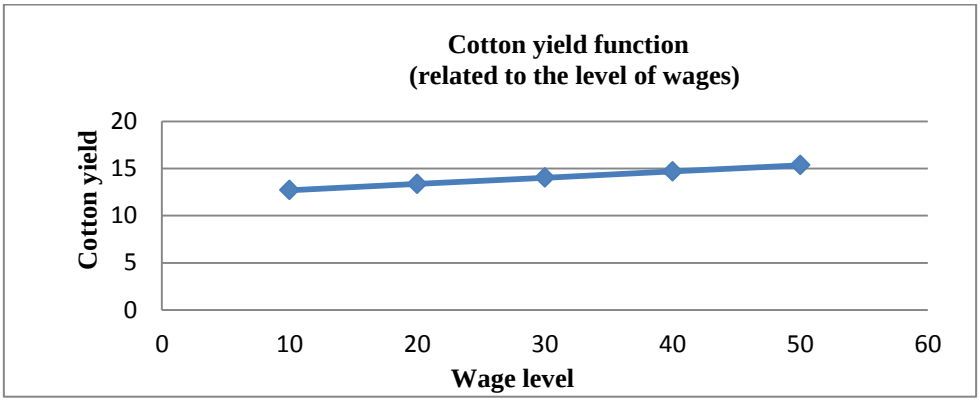
To clarify the dependence of the cotton yield on wages, we examined the double correlation between the cotton yield and the level of wages using the example of the regional cotton industry in the Tashkent region.

The regression equation for this pairwise relationship is as follows:

$$Y = 12,05 + 0,066X$$

where, Y is the yield of cotton, centners/ha, X is the level of wages, sum/person. - hour.

EPRA International Journal of Economic Growth and Environmental Issues- Peer Reviewed Journal
ISSN: 2321-6247
Volume: 8| Issue: 2| September 2020 | Journal DOI : 10.36713/epra0713 | SJIF Impact Factor (2020): 8.007



An increase in the level of wages by 10 soums per hour per person for the objective conditions on cotton farms in the region during the study period can provide an increase in cotton yield by 0.7 centners/ha.

Based on the obtained equation, it is possible to determine the theoretically probable level of labor efficiency at the current level of wages. For example, in the A. Ikramov farm, the yield at the level of 282.2 soums per person-hour was supposed to be 30.7 centners/ha, but in practice, the yield in this farm was 27 centners/ha.

It is likely that factors not accounted for in this model will affect the inability to grow the expected yield.

Naturally, the level of wages per person-hour will grow infinitely, and this will not lead to an infinite increase in cotton yields. The level of wages per person-hour in the cotton farms of the Urtachirchik region this year ranged from 93.5 soums in the A. Navoi farm to 337.7 soums in the A. Ikramov farm.

CONCLUSION

This regression equation shows that the value of the intercept is that the cotton yield can be 12.05 centners/ha at the lowest wage costs. That is, this volume of cotton yield can be described as a yield of biological and potential cotton raw materials per hectare for the conditions of the region.

It is becoming increasingly difficult for farmers to achieve profitable levels of cotton production and cultivation from year to year. Even the long-term experience of farmers in achieving production efficiency does not allow this to be achieved.

In this case, it is important to predict various economic indicators. Estimated forecasts for the short term based on identified econometric models show that cotton yields tend to grow due to changes in factors that affect it. Therefore, identifying their trends will help us predict other economic indicators.

REFERENCES

1. *Decree of the President of the Republic of Uzbekistan dated February 7, 2017 PF - 4947 "On the strategy of actions in five priority areas of development of the Republic of Uzbekistan". Section 4*
2. *G.Shadmanova, B.O.Rakhmankulova, Kh.Kh. Karimova "Econometrics" (Toshkent, 2020)*
3. *G.Shadmanova, B.O. RakhmankulovaMethodological guide for practical lessons on the subject("Fundamentals of Econometrics", Toshkent, 2019)*
4. *B.B. BerkinovEconometrics(Toshkent, 2015)*
5. *B.B.Berkinov, B.O.Rakhmankulova, Kh.Kh.KarimovaEvaluation of the efficiency of production activities of farms and modeling of development processes(Monograph, Toshkent, 2013)*
6. *B.B.Berkinov, B.O. RakhmankulovaEconometric modeling for assessing the efficiency of the use of production resources in cotton growing (Scientific journal "Itisodiyotvata'lim", 3, 2013, Toshkent)*
7. *B.O. RakhmankulovaAgricultural development trends and productivity changes // (Business Expert Magazine, No. 6, 2013, Toshkent)*
8. *B.O.RakhmankulovaEconometric study of the efficiency of agricultural production (Abstract, Toshkent, 2006)*
9. *A.M. Gataulin and other Mathematical modeling of economic processes in agriculture (Moskow,Agroproizdat, 1990)*
10. *A.G. GranbergStatistical modeling and forecasting(Moskov, "Finance and statistics", 1990)*
11. *I. D. PolitovaAnalysis of variance and correlation in agricultural economics (Moskow, "Kolos", 1978)*
12. *www.ziyonet.uz - educational Internet network*
13. *lex.uz - legal web page of Uzbekistan*