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Models for Increasing the Efficiency of Innovative Development of the Agricultural Sector in the Region

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Abstract: The article analyzes models for increasing the efficiency of innovative development of the agrarian sector in the region and develops proposals for their use.

Keywords: Region, econometric model, agricultural sector, innovation, innovation activity, innovative development, efficiency, production, production resources, labor resources, labor force, labor productivity.

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Introduction

In the Address of the President of the Republic of Uzbekistan to the Oliy Majlis of December 29, 2020, it was said that "... the basis of the country's development, of course, is science and innovation."

The strategy of actions for the further development of the Republic of Uzbekistan states: “Deepening structural changes and consistent development of agricultural production, further strengthening the country's food security, expanding the production of environmentally friendly products, a significant increase in the export potential of the agricultural sector;

further optimization of arable land by reducing the area under cotton and grain crops, planting potatoes, vegetables, fodder and oilseeds on empty land, as well as placing new intensive orchards and vineyards;

creation of favorable conditions for the promotion and development of diversified farms engaged in the production, processing, storage, sale, construction and provision of services, as well as the production of agricultural products;

Implementation of investment projects for the construction of new processing plants, reconstruction and modernization of existing ones, equipped with the latest high-tech equipment for deep processing of agricultural products, the production of semi-finished products and finished food and packaging products ”[1].

Main part

Currently, the lack of an effective agricultural knowledge and information dissemination system that links innovation, research, education and information and advisory services remains one of the most serious obstacles to the development of the sector on a scientific basis. Public investment in agricultural research is 0.2% of the total agricultural budget.

The lack of effective mechanisms for interaction between science and industry, the introduction of the results of budget research does not allow the formation of an innovative agricultural sector.

The yield of local varieties of agricultural crops is low and does not meet the requirements of foreign markets. There is a growing dependence on expensive imported varieties of crops that are not adapted to local conditions.

Innovative education, refresher courses and vocational training, the educational system, the form and methods of teaching in educational institutions do not meet modern requirements. It is necessary to create a system of intersectoral and interdepartmental coordination to study the requirements of the labor market and introduce new specialties.

Currently, there are no modern private structures in the country to disseminate innovative knowledge and information about agriculture.

The creation of a modern, integrated and flexible system in agriculture, food supply, education, training and information and consulting services is the main goal of increasing the efficiency of

[1] Decree of the President of the Republic of Uzbekistan "On the Strategy of Actions for the Further Development of the Republic of Uzbekistan" dated February 7, 2017 No. PF-4947 // lex.uz

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innovative development[2].

The task is to bring the Republic of Uzbekistan among the 50 leading countries of the world by the global innovation index by 2030.

Results and Discusions

To calculate a single index for assessing the level of innovative development of agricultural sectors, first of all, it is necessary to single out 3 sub-indices that characterize it.

The first is the Index of Innovative Opportunities (Ii), which reflects the state, potential and resources of intellectual and organizational resources, material and technical complex, labor, information and financial resources (number of research (Kt), research (St) and development). (Si), the availability of patents (Ps)) consists of indicators consisting of indicators:

$$Ii=(Kt+St+Si+Ps)/4 \quad (1)$$

The second is the Index of Consumer Demand for Innovation (ITD), an index of indicators that reflects the level of consumers' readiness to purchase smart products and use them in business (agricultural infrastructure (Fi) and the financial condition of agricultural enterprises (Fqx).), Qualifications of specialists). level (Md), availability and use of intangible assets in enterprises (Ad)):

$$Itd= (Fi+ Fqx+ Md+ Ad)/4 \quad (2)$$

Thirdly, the structural index (DI) represents the level of integration and efficiency of tasks performed using elements of the innovation infrastructure in the process of innovative development of agricultural infrastructure (the number of enterprises in the innovation infrastructure Ks, the share of enterprises engaged in innovative activities in the total infrastructure of Ku objects; net profit (SF):

$$It=Ks+Ku+SF/3 \quad (3)$$

The unified index of the region is calculated as the arithmetic average of the individual indices. In turn, each index is represented by a group of indicators. The peculiarity of these indicators is that the results obtained for each region are compared with the corresponding indicators or standard values for the average republic.

As a result of the development of innovative infrastructure, taking into account the fact that the development of any activity in society is based on economic interests, four subjects: from the point of view of strategic, social and economic benefits that should be taken into account by state and territorial authorities (government), economic entities in the agricultural sector (farmers, consumers of innovation infrastructure services) and objects of innovation infrastructure. The proposed assessment system is universal and can be used to monitor the activities of various objects of the innovation infrastructure.

In the course of the study, the methodology for determining indicators of economic, social and environmental-economic efficiency achieved as a result of the introduction of biological, technical and technological, organizational and environmental innovations was improved. The indicators of the effectiveness of the innovative development of agriculture are systematized according to the type of efficiency obtained and compared with different costs (Table 1).

[2] Decree of the President of the Republic of Uzbekistan "On Approval of the Strategy for Innovative Development of the Republic of Uzbekistan for 2019-2021" dated September 21, 2018 No. PF-5544.

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Table 1.

Performance Indicators for Agriculture and its Serving Infrastructure Based on Innovation Activities calculation method

Efficiency types	Types of innovation	Indicators	Note
Economic	Biological	Bs= ΔYaM/Im	Bs- efficiency gained by increasing the genetic potential of plants (animal husbandry) (implementation of biological innovations) ΔYaM- the volume of additional agricultural (livestock) products obtained through biological innovation Im-The costs of increasing the genetic potential of plants, the effective use of high-yielding varieties, biotechnology, genetic engineering (improving the genetic potential of livestock, high-productivity livestock, biotechnology, genetic engineering)
		Bso=ΔYaM/Ob	Bso- efficiency obtained by improving the nutritional base Ob- quality of feed and animal feed the cost of improving the diet
		Kso=Oh/ΔYaM	Kso- feed conversion ratio, i.e. the amount of feed consumed per unit of production (1 kg of product gain, 1 kg of milk, 1 kg of wool, etc.); Oh- amount of feed consumed; ΔYaM- livestock products
	Organizational and technological	It=ΔYaM/Fas+Fay	It- technical and technological efficiency of agriculture (animal husbandry); ΔYaM- products obtained as a result of technical and technological re-equipment of agriculture (animal husbandry) (improvement of energy resources, introduction of innovative developments); Fas+Fay- basic and spent on technical and technological re-equipment of the agricultural (livestock) sector working capital cost
		Te=ΔYaM/Er	Te- technical and technological efficiency of improving energy resources Er- energy resources spent on technical and technological re-equipment of agriculture (animal husbandry) value

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Economic		Ti=ΔYaM/Iin	Ti- Technical and technological efficiency through the introduction of innovative developments and projects (new varieties, modern irrigation methods, artificial insemination, new breeds); Iin- profitability through cost savings through innovation
		It=ΔT/Iin	It- profitability through cost savings through innovation; ΔT- product development as a result of innovation cost savings in production; Iin- Innovation costs
		I*f*=F/Iin	I*f*- by increasing profits when introducing innovations obtained profitability; F- benefits of innovation
		R=F/Iin*100%	R- the level of profitability of innovation, in percent
		Mu=ΔYaM/V	Mu-labor productivity of innovative development; V- labor costs resulting from innovation decline
Social	Organizational	RID=(ND-ST)*Jpxq	RID- real disposable income; ND- nominal income; ST- taxes, mandatory payments Jpxq- money purchasing power index (to the price index reverse indicator).
		RIH=(NIH-SA)*Jpxq	RIH- real wages; NIH- nominal salary; SA- taxes, mandatory deductions for work
Environmental and economic	Ecological	Es=Em/X	Es – environmental and economic efficiency; EM – volume of produced environmentally friendly products; X – the amount of costs for the production of environmentally friendly products

Currently, cost-effectiveness indicators are used for each type of product, and to determine the efficiency obtained as a result of the innovative development of the entire network, the influence of various resources on the production process is also quite difficult, which leads to different effects. Therefore, it is important to develop indicators that reflect the level of innovative development of the agricultural sector and obslujivayushchey ego infrastructure.

When assessing the distribution of agricultural resources of production resources based on the concept of Wolfred Pareto, the efficiency of production resources, including the efficient use of labor resources, the distribution of material and labor resources will be efficient if the agricultural production process is not carried out by reducing the production of products other than the products of the industry mentioned in the example. The efficiency of labor resources,

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the production process depends on the level of distribution and use of living labor, including labor in the agricultural production of labor resources.

In agriculture, the efficiency of labor resources should be considered effective if the value of the resources involved in production is not distributed among production units when creating material goods that are produced in a certain way. The main reason for this is that production costs in production units have reached their marginal nature.

Therefore, given that one of the main material resources for the effective use of labor resources employed in agricultural production is machinery and technology, it is advisable to use the method of determining their technological efficiency in determining their efficiency of use.

Technological efficiency can be determined as follows. Based on the maximum use of technological resources involved in production, the product produced per unit of labor resources can be expressed in physical terms or in value. Increasing the efficiency of using the human factor in agriculture, not only the human factor, but also the efficiency of the production process as a whole, provides a reduction in the cost of production costs. When determining the efficiency of the use of labor resources in agricultural production can be determined mainly by two methods. This method can first determine the ratio of the product produced in the manufacturing process to the production costs incurred in relation to the labor resources involved in production, or the labor costs they spend (1 hour, one shift, one month, one quarter, six months. Or year).

Second, you can calculate the amount of product produced per unit of labor expended on the production of a unit of output. Objective and subjective reasons affecting the growth of labor resources in production on the basis of socio-economic analysis of the dynamics of labor productivity and productivity growth in order to ensure the growth of labor productivity, the efficiency of part of the labor force in production can be identified.

When determining the efficiency of the use of labor resources involved in production in the conditions of market relations, it is advisable to determine the economic significance of the categories "labor productivity" and "labor force" involved in labor. Formulas for determining the efficiency of the use of labor resources in agriculture (table 1.7) are summarized in one system.

Indicators and econometric models of efficient use of labor resources in agriculture

Table 1

Иқтисодий кўрсаткичлар	**Формула**	**Кўрсаткичлар**
The product is produced in natural form	$U_{ч.м} = M_x \| M_c$	U- produced product; M_x- gross product; M- total labor costs, working hours, working days.
Determination of efficiency in the form of value	$M_p = Q \| M_c$	M_P - in the form of cost; Q- created product in value form, in soums; M- labor costs, working hours, working days, in soums.
Labor expended in the production of a product.	$T = M_T \| Q$	T- labor required to produce a unit of output, in man-hours; Q - Produced product is calculated in centners.
Labor costs in the		M - labor costs in kind;

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production of one type of product.	$M_{бир} = QR\|M$	QR- is the coefficient of the conditional transformation of the product in its natural state..
The gross labor value of production	$U_в = U_{мх}\|A_{цм}$	B - working hours; Um - is the product produced; Am - working hours per person / hour.
Determination of efficiency through the index of the form of the total cost.	$Y_u = \frac{Q_1 H_o}{B_1} \div \frac{Q_o H_o}{B_o}$	Y_u- general index; Q- the volume of products produced in the plan is calculated in centners H_0- total volume of products manufactured, in centner calculations; Q- planned volume of production, in centners; H_o- in value terms of the planned volume of production, in soums; B_1- scheduled time spent; B_o- time spent on practice per man/hour.
The ratio of total costs per unit of labor to labor costs in the base period when calculating labor productivity	$M = \frac{M_o Q}{B_1}$	M- the volume of products produced on the basis of the plan, in centners; Q - planned volume of production, centners; B_1- zaplanirovannoe zatrachennoe vremya, chel / chas.

Labor productivity with the involvement of labor is an economic category that differs in content by its socio-economic nature. Labor productivity, if expressed in terms of the volume of output produced during a given period of work, means the volume of work performed by the average labor force employed in production, or the average volume of work performed by the labor force employed in average production.

Considering that the efficiency of labor resources involved in agricultural production is associated with an increase in labor productivity, we can say that the efficiency of labor resources is directly proportional to production efficiency, although it differs from production efficiency in its socio-economic component. nature.

In modern market conditions, the development of the production process based on free competition, the correct organization of the use of available labor resources, involvement in agricultural production and its use in other sectors of the economy or services are the main problems of the market economy. It is necessary to improve the origin.

Conclusions

Thus, on the basis of these indicators, it is possible to determine the production efficiency per hour, day, total labor costs of labor resources, labor costs for the production of the same type of product, the cost of labor expended, and its efficiency. relative to basic labor costs.

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