ASSESSMENT OF STRUCTURAL CHANGES IN AGRICULTURE OF THE REPUBLIC OF UZBEKISTAN

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ABSTRACT

This article is devoted to the assessment of structural changes in agriculture in the Republic of Uzbekistan. First of all, the article deals with current issues of agriculture and the tasks of the Republic of Uzbekistan. This is followed by a brief review of the scientific literature on the subject, i.e. ideas on structural change, structural growth, and the concept of reference content. The research methodology then outlines the formulas used to find the reference values for the agricultural composition, the proportionality to the reference content (in coefficients), and the value of the improved Lilien index (MLI). The results of the empirical analysis express the share of production of basic agricultural products in the structure of the economy (in percent), changes in the structure of production of basic agricultural products (in percent to total) and reference values. At the end of the article, summarizing all the results of the calculations, there are scientific conclusions and recommendations on changes in the structure of production of basic agricultural products in the country.

Keywords: agriculture, proportionality ratio, Lilien index, structural change, national economy, economic growth, benchmark content.

INTRODUCTION

In the economy of each country, special attention is paid to the development of areas that affect the improvement of people's well-being and the efficient use of all resources. The economic strengthening of the independence of the Republic of Uzbekistan is in many respects connected with the effective development of agriculture.

At present, the needs of the population in agricultural products are mainly produced by local producers, ie small businesses and private entrepreneurs. Providing the population of the country with high-quality flour, cereals, bread and pasta,

confectionery, fat and oil products, meat and dairy products, food concentrates is recognized as the most important task of the national economy.

Foreign scientists predict that the food shortage myammoci may become the number one topical issue in the world in the near future. The United Nations forecast predicts that, in addition to hunger, the ever-increasing number of people is leading to a decline in the quantity and quality of food consumed. Two billion people, or 25.9 percent of the world's population, have experienced hunger or will not have access to nutritious and adequate food in 2019. If we do not act quickly and boldly, this situation may worsen and lead to an increase in food shortages in the long run [1].

Nowadays, the population's demand for quality agricultural products is growing rapidly and the composition is constantly updated, the rapid innovation processes in the world economy and the intensification of interstate economic competition, the formation of an effective structure of agricultural production in line with changing market conditions. pursuing an important structural policy in the industry is one of the most pressing economic tasks today.

Therefore, the assessment of the structure of production of this agricultural sector, the study of the laws of formation of shares in it is very important in the assessment of this structure, and the formation of optimal balance in the structure of agricultural production is a prerequisite for effective structural policy.

Particular attention is paid to the implementation of deep structural changes in the national economy, in particular, deepening structural changes in high-tech sectors of the country, as well as increasing its competitiveness through modernization and diversification of leading sectors of the national economy. The implementation of tasks such as further modernization and diversification of the industry through a qualitatively new stage aimed at the rapid development of value-added finished products based on deep processing of resources is of particular economic importance [1].

Therefore, this article focuses on the assessment of structural changes in the agricultural sector and the study of significant quantitative changes in it. In the article, the problem of assessing structural changes in agricultural production was carried out using methods such as "proportionality coefficient" and "improved Lilien index".

LITERATURE REVIEW
The analysis of scientific sources shows that the issues of quantitative assessment of structural changes in agriculture and its economic aspects have not

been sufficiently researched. However, the ongoing structural changes in the national economy and its sectoral structure, as well as their causes, are more clearly covered than the issue at hand.

It should be noted that in many studies, statistical approaches to the concept of "structural change" are very common. In particular, such approaches T.N. Agapova, A. Buz-Galina, K. Gatev, M.R.Efimova, V.K. Zadorojniy, L.S. Kazints, A. Kolganov, O. Yu. Krasilnikova, S.V. Kurysheva, V.M. Ryabtseva, A. Salay, M.M. It occupies a very wide place in the works of Yuzbasheva and M. Lendesman, the main reason being that the study of changes in economic phenomena in space and time is the main subject of statistical science.

Including L.S. According to Kazinets, the change over time of the shares, which represent the individual elements of the set, means a change in composition, that is, structural shifts [2].

"The concept of structural change and structural growth takes place in two rounds," Lendesman said. The first is a change in the structure of content, i.e., production, number of people employed, exports, imports, and so on. The second is changes in inter-component relations, the relationship between production and labor, or direct investment, import-export dynamics, and so on. Structural change represents an improvement in the quality and gradual development of economic systems. Typically, structural changes in the economy are followed by technological and administrative changes. Technology, literacy and institutional units, which are important factors in the economy, have a significant impact on the structural aspects of economic growth "[3].

Kuznets: "Economic growth in the country can be assessed by the ability of manufactured products to meet the growing needs of the population in the long run. These growth opportunities are based on the development of techniques and technologies, the necessary changes in institutional structure and ideology." [4]

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According to many experts, the existence of deep structural imbalances in the world economy has been recognized as one of the main causes of the recent global crisis. However, numerous studies show that "structural imbalance" has not only been

one of the main causes of the recent global crisis, but it has also been cited as one of the main causes of past global crises.

Although not exactly similar to this study by A. Lewis, but in some ways close to the content of his research can be found in E. Engel's research. In particular, according to Engel's first law, "as household incomes increase, so do the costs of food (agricultural products) in the structure of their consumption" [6].

Although Engel's law expresses structural changes in household consumption, its economic consequences serve to explain the reasons for the variability of structural changes in the national economy. Because, according to the scientist, as the income of households increases, the share of expenditures on valuable goods and services in the structure of their consumption increases. He explained that this will stimulate the growth of industries that create valuable goods and services.

At the same time, S.O. Khomidov in his research used the coefficient of proportionality and the improved Lilien index in the structural assessment of the production of the pharmaceutical industry. He noted that the share of basic pharmaceutical products and drugs in the structure of the manufacturing industry was a maximum of 1.33%, which was not enough [7]. His subsequent scientific research confirmed that there is a positive correlation between the growth rate of processing in the country and the growth rate of labor productivity in the processing industry, as well as the technological level of the processing industry is the main source of labor productivity growth.

HN Sabirov also confirmed in his research that the dynamics of general changes in the structure of basic food production, the growth trend of the MLI index in the period from 2015 to 2018 is stable. Given that the food industry is the most high-tech sector of the economy, the figure for 2018 was 15.96 percent, which the author notes is insufficient [8].

As a logical continuation of the above scientific research, the issue of quantitative assessment of structural changes in agricultural production, which is the most high-tech sector of the economy, is discussed below.

RESEARCH METHODOLOGY

There are different approaches to describing and evaluating structural changes in the scientific and economic literature. From these we use the "coefficient of proportionality" proposed by P. Vatnik, taking into account the nature of the study, and it is found as follows [9].

$$Prop\,[X,Y] = \frac{(\sum_i X_i Y_i)^2}{(\sum_i x_i^2)(\sum_i Y_i^2)}\;(1)$$

P. Vatnik's "coefficient of proportionality" allows to evaluate different compositions or sets, and this coefficient is characterized by:

- for an arbitrary $a, b > 0$, the equation $Prop\,[aX, bY] = Prop\,[X, Y]$ is appropriate;

- all possible values of the coefficient of proportionality lie in the range $0 \leq Prop\,[X, Y] \leq 1$.

The coefficient of proportionality represents a numerical measure of the closeness between the content standard and the components being evaluated. If they are exactly the same, then $Prop\,[X, Y] = 1$. However, the above study did not provide sufficient theoretical explanations for the notion of "benchmark content" or "benchmark" criterion [9].

Exactly the above formula (1) is also found in E.Gorlova's research, where $x_i - i -$network is recorded as the share of the assessed country's GDP, and $y_i -$ as the share of the same $i -$ network in the standard GDP. This study also does not provide sufficient explanations for the concepts of "reference" and "reference countries". However, in this study, the sectorial structure of the national economy formed according to the "Organization for Economic Co-operation and Development (OECD) countries" was adopted as a benchmark [10].

In E.B. Oleynik's research, according to the above formula (1), the variables x_i and y_i are appropriate indicators of the state of the composition at different moments of time, and it is noted that the coefficient of proportionality is structural and determines the degree of proportionality of the variables [11].

According to S.Khamidov, the "standard composition" is the "effectively formed content", all the evaluated components are compared with it, and based on the obtained empirical values of the coefficient of proportionality, he concluded how the evaluated components are proportional to the "effective composition". [7].

Taking into account the above research and ideas, the "benchmark composition" function is performed by the composition consisting of the average of the shares of individual annual agricultural production volumes in the study period (2010-2018) in the total output of major agricultural products.

Another important method of assessing structural changes is the Lilien Index, which is defined as follows [12]:

$$LI_{s,t} = \sqrt{\sum_{i=1}^{n} x_{[it]} \cdot \left(ln \frac{x_{[it]}}{x_{[is]}} \right)^2} , x_{[is]} > 0, x_{[it]} > 0 \ (2)$$

Here, $x_{[is]}$ and $x_{[it]}$ are the shares of i-agricultural product or processing in total s of agricultural output in periods s and t, and the LI index is limited to "0" below. If the index assumes a value of "0", it means that no structural changes in the structure of production in the period under review.

The index also takes into account the size of the shares and the size of the variance [13].

However, Dietrich in his study found that in the Lilien index $SCI_{[st]} = SCI_{[ts]}$ (SCI- structural change index) and $S_{[s,t]} \leq S_{[s,q]} + S_{[q,t]}$ ($s < q < t$) records a violation of the conditions and therefore it uses an improved Lilien index (MLI) and it looks like this:

$$MLI_{s,t} = \sqrt{\sum_{i=1}^{n} x_{[is]} \cdot x_{[it]} \cdot \left(ln \frac{x_{[it]}}{x_{[is]}} \right)^2} , x_{[is]} > 0, x_{[it]} > 0 \ (3)$$

If we consider the equation $log_c \left(\frac{a}{b} \right) = log_c a - log_c b$, then formula (3) can also be written as follows:

$$MLI_{s,t} = \sqrt{\sum_{i=1}^{n} x_{[is]} \cdot x_{[it]} \cdot \left(ln x_{[it]} - ln x_{is} \right)^2} , x_{[is]} > 0, x_{[it]} > 0 \ (3)$$

In this case, $x_{[is]} > 0, x_{[it]} > 0$ and $\sum_{i=1}^{n} x_{it} = 1 \forall t$ [14].

In research, it is noted that this index varies between 0 and 1. It is noted that if the result is close to 0, then there is no significant change in the content, if the result is closer to 1, then there is a high change in content [15]. However, some sources indicate that the index varies between 0 and 100, with a value of 0 indicating no structural change, and a value of 100 indicating a reverse structural change [16], while others suggest a minimum value of this index. It is noted that it is equal to 0 and its upper limit does not exist [17].

In his research, Nishi notes that low MLI index values indicate that structural changes are progressing at a slower rate, while higher values indicate that structural changes are progressing at a higher rate [18].

RESULTS AND DISCUSSION

According to the analysis of the study, from 2010 to 2018, the share of agricultural production in the GDP structure had a different development trend. Over the years, the share of this type of production in GDP has fluctuated in the range of 41.67-48.99 percent. From 2010 to 2018, the share of agricultural production in GDP was the lowest in 2010 (41.67%), and in 2017, the share of agricultural production in this structure was the highest. 48.99 percent (Figure 1).
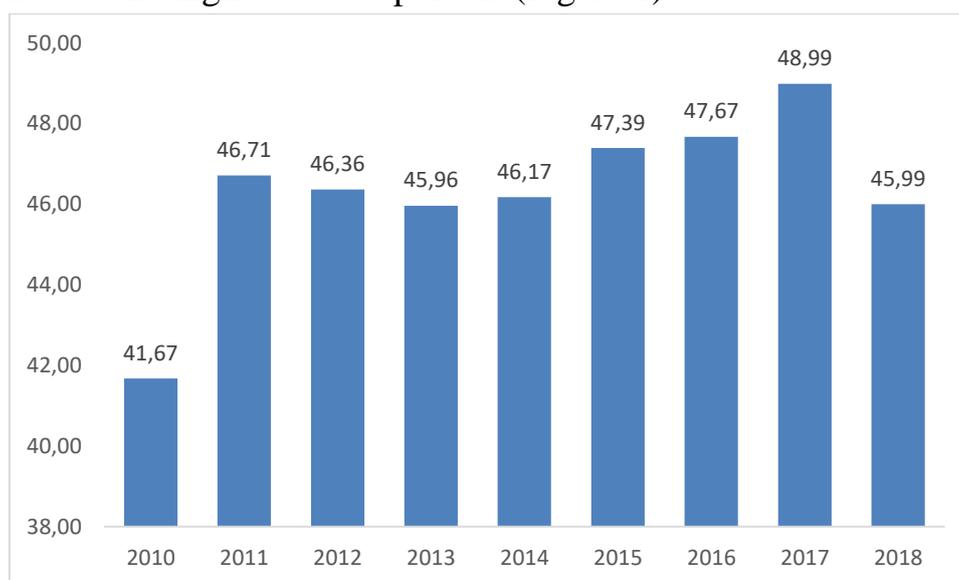
Figure 1. Share of agricultural production in GDP (in percent)
Source: Author's calculations based on annual statistical bulletins of the State Statistics Committee of the Republic of Uzbekistan.

In the structure of agricultural production from 2010 to 2014, the share of the agricultural sector decreased, while during this period, the share of the livestock sector increased. (Table 1).

Table 1

Changes in the structure of agricultural production (as a percentage of total)

Production of agricultural products	2010	2011	2012	2013	2014	2015	2016	2017	2018
farming	58,719	57,136	54,874	54,545	52,808	55,649	53,422	56,210	52,506
animal husbandry	41,280	42,864	45,126	45,455	47,192	44,351	46,578	43,790	47,494
Total:	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Author's calculations based on annual statistical bulletins of the State Statistics Committee of the Republic of Uzbekistan.

The results of the analysis show that while the largest share in the structure of agricultural production was agriculture (average share 55.1%), the smallest share in this structure was livestock production (average share 44.0%). The reference values

for the structure of agricultural production were formed from the average values of the share of annual agricultural production in total agricultural production in the period 2010-2018 and expressed the following indicators (Table 2).

Table 2

Reference values for the composition of agricultural production

Production of agricultural products	Reference structure (average values)
farming	55,1
animal husbandry	44,9
Total:	**100**

Source: Author's calculations based on data from the State Statistics Committee of the Republic of Uzbekistan.

According to the results of the empirical analysis, the values of the corresponding correlation coefficients between the formed standard structure of agricultural production and the structure of agricultural production formed during 2010-2018 expressed the following trend (Figure 2).
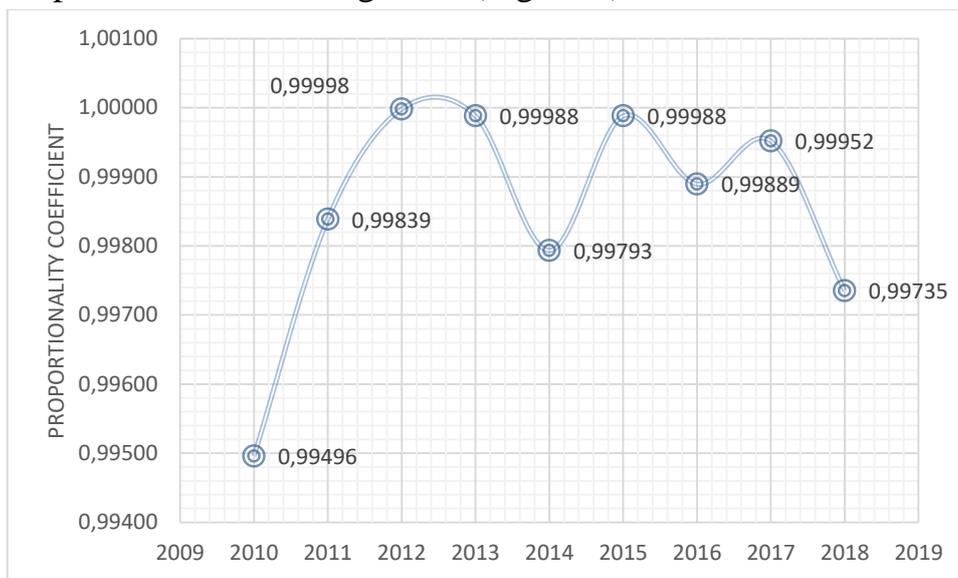
Figure 2. Proportion of the structure of agricultural production formed in 2010-2018 to the standard composition (in coefficients)

Source: (1) Author's calculations based on formula.

The coefficients of proportionality of the components of agricultural production show that the highest value of this indicator was recorded in 2012 (the value of the coefficient of proportionality in the year under review was 0.999998), and the lowest value in 2010 was 0.99496.

The results of the analysis of the study confirmed that the composition of total agricultural production formed in 2017 was more efficient than the composition

formed in other years. This is because the empirical values of the proportionality coefficient obtained in this year show that the production of agricultural products is very close to the reference composition.

According to our calculations, the improved Lilien Index (MLI) expressed its lowest value (MLI index value 0.465) in the period 2012-2013, and its highest value in the period 2017-2018 (MLI index value 5.237) (Figure 3).

Figure 3. Dynamics of general changes in the structure of agricultural production (Change in MLI index values)

Source: (3) Author's calculations based on formula.

The dynamics of general changes in the structure of agricultural production shows that the value of the MLI index had a steady growth trend in the period from 2012 to 2015. If we evaluate the dynamics of the MLI index on the basis of the results of the Nishi study, then it can be noted that the changes in the structure of agricultural production in 2015-2018 went at a high rate.

If changes in the dynamics of the MLI index are observed in S.M. According to Okladnikova's research, the structure of agricultural production formed in 2012 is at a lower level than its structure formed in 2013, and the structure of agricultural production formed in 2010 is at a higher level than its structure formed in 2011. it can be noted that [17].

CONCLUSIONS

Summarizing the above results, the share of agricultural production in the structure of the economy in the period from 2010 to 2018 fluctuates in the range of 41.67-48.99 percent. The share of agricultural production in this structure in 2018 was 45.99%, which means less than in previous years.

According to our scientific conclusions, the coefficient of proportion is a numerical measure of the closeness between the content being evaluated and the reference content. When they are fully matched, this coefficient is equal to 1. If the

value of the calculated proportionality coefficient deviates from 1, the content formed in the year under study differs from the reference content, and conversely, the closer the proportionality coefficient approaches 1, the closer the content formed in the year under study to the reference content. Based on these considerations, the composition of agricultural production formed in 2017 was found to be "most efficient" compared to the composition formed in other years.

The dynamics of general changes in the structure of agricultural production confirmed the steady growth trend of the MLI index in 2015-2018. Considering that agriculture is the most high-tech sector of the economy, the figure of 45.99 percent in 2018 is not enough, according to the author. In this regard, in order to increase the share of this sector in the economy and GDP, the widespread introduction of innovative developments in this sector, training and improving its quality, attracting innovative technologies and foreign investment, in turn, deepening local agricultural raw materials. processing is expedient.

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