

The Globalization Trends of the Agrarian Sector Development

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The article has been devoted to the agrarian sector development's problems in the world. Agricultural production trends have been identified. The idea of the research has been to apply a cluster analysis technique for identifying these trends. It has been confirmed regularity that the share of agriculture added value has been higher in the poorest countries. It has been proved that in countries with a dominant agrarian trend aggregate economic development indicators have been lower than in industrialized countries. Cluster analysis has been carried out for determining the agrarian sphere impact on the countries' globalization development level. Hierarchical clusterization's dendrogram of the leading countries according to the integral globalization development index and the value added of agriculture per person has been constructed. In particular, European countries have been grouped using the cluster analysis methodology based on aggregate indicators of development, including the share of agriculture in GDP, nominal GDP and GDP per parity of purchasing power (PPP) per capita, country's territory, population.

Keywords— Agrarian sector, Agriculture gross value added, Globalization trend, Cluster analysis, Clustering dendrogram

I. INTRODUCTION

The agrarian sector development under conditions of economy's globalization has been characterized by a food crisis and an increase in threats to food security. In the framework of this problem, many features of the agrarian sector development can be distinguished. An increase in the population causes a shortage of food resources. The natural soils potential, agricultural animals and plants has been exhaustive, and therefore can't meet the growing needs of mankind. Under the conditional of growing demand for food, on the one hand, and the inability of natural resources to provide it, on the other hand, technologies that contribute to the intensification of agricultural production have been developed.

At the same time, the growth of consumption gives impetus to the non-traditional technologies development, in particular genetic engineering, the impact of which on the human has been not proved. Under the conditions of the international relations imperfection, the inefficiency of the

international trade mechanisms has been manifests itself. The consumption culture in the countries of the world is different. This does not make it possible to unify the management methods in the agrarian sector on a global scale. An economic paradox is emerging, which is that in countries with a dominant agrarian trend, aggregate indicators of economic development are lower than in industrialized countries. This is due to the world disparity in prices for food and manufactured goods. The agrarian sector development effectiveness in the context of global competitiveness has been manifested only with the production of goods with high added value. In modern conditions, most countries with a high agricultural potential are export mainly raw materials, while losing a significant share of potential GDP.

Quite a few scholars have focused their attention on the issues of socio-economic development of countries and individual industries under the conditions of the economy globalization. The scientific works by L. Boldyreva, [3], P. Dicken [5], Y. Doz [6], G. Duhinets and V. Tronko [7], H. Fitzov and L. Zidek [8], L. Leonidou, D. Palihawadana, and M. Theodosiou [9], S. Sehedra [14], O. Soskin [16] and other have been the most complete. Scientists consider various aspects of globalization and development of the agrarian sector under its influence.

Current trends of agrarian sector development have been considered in works by J. Betakova, K. Haviernikova, D. Jaskova, V. Hagara and R. Zeman [2], D. Parmacli, L. Soroka, and L. Bakhchivanji [12] and R. Sheludko, Yu. Pashchenko, Yu. Filimonov, O. Bukhalo [15]. The scientists have been explored the issue of agricultural producing efficiency, finance agricultural development, governance support agrarian sector. In addition, the modeling of the development of this market segment, as well as the question of the division of countries according to the similarity of development in the global environment, is only partially considered in up-to-date works. Worthy of note are works [4], in which scientists consider different methods of economic and mathematical modeling of market development and its subjects. We consider, the construction

of an economic and mathematical model of the agrarian sector development in the context of economy globalization is necessary. This problem has been considered in our work [13], now the issue needs development.

II. RESEARCH FINDINGS

The global trends in the agrarian sector have been shown a decline in the share of agricultural added value in world production. In 1995, this indicator has been made up 8 %, in subsequent periods a steady trend towards a decrease of this indicator to 3.69 % in 2016 has been observed (see Fig. 1). Currently, the 2017-2018 summarizing world statistics data about the agrarian sector are officially unavailable.

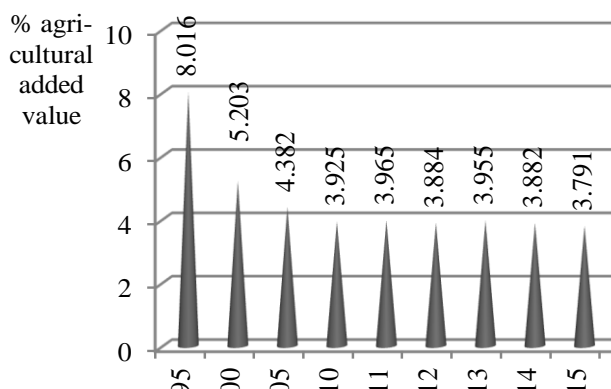


Fig. 1. Agricultural share in world added value, %, 1995-2016

Source: summarized by the authors [1, 10, 11].

This decrease has been primarily not due to the decrease of agricultural production volumes and through the development of industrial production of other goods with high added value. In terms of world regions, the largest share of agriculture in the world added value has been observed in poor countries with significant external debt – 27.8 % in 2016. The global volume of world agricultural production has been constantly grown. Thus, the volumes growth index of world agricultural production in 2016 compared to 2015 has been, respectively, 1.001 and 1.017 in actual and constant prices (see Fig. 2).

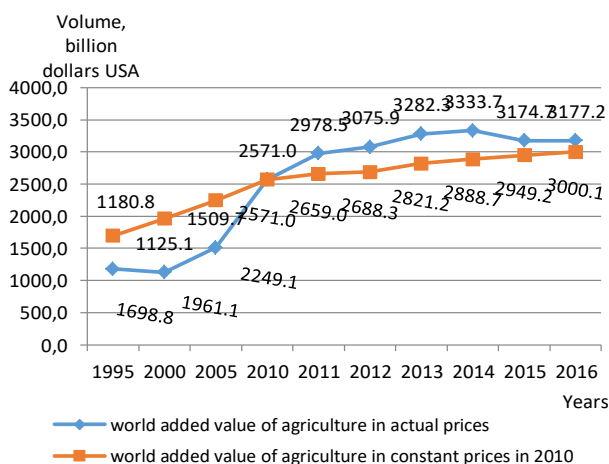


Fig. 2. A Dynamics of agricultural products world added value, 1995-2016, billion dollars USA

Source: summarized by the authors [1, 10, 11].

The overall increase in the value added of agricultural production has been 23.6 % and 16.7 %, as compared to 2010. The average rate of increase in production volumes every five years by 2010 in constant prices has been accounted for 14.8 %. Agricultural production in actual prices has been increased most significantly in 2010 compared to 2005, for 70.3 %. In general, the added value of agriculture in 2016 has been amounted to 3000.1 billion dollars USD and in constant prices in 2010 and 3177.2 billion dollars USD in actual prices.

In 2016, in actual prices, this indicator has been amounted to 1378.2 billion dollars USD, and in constant prices in 2010 this indicator has been amounted 1159.1 billion dollars USA. Compared to 2015, the agriculture added value in the region of East Asia and the Pacific has been increased by 26.9 billion dollars USD, or 2.4 %, in constant prices, and compared to 2010, this increase has been 194.4 billion USD, or 20.2 %. Also, agricultural production in Europe and Central Asia has been increased by 16.7 billion USD, or by 4.02 %, compared with 2015 in constant prices and by 40 billion USD, or 18.1 %, more compared to 2010. Production volumes have been increased in Latin America and the Caribbean, by 7.6 billion dollars USD, or 2.8 %, compared to 2015, and 55.1 billion USD, or 24.3 %, as compared to 2010. Table 1 shows countries whose share of agricultural added value in world production is more than 1 %.

TABLE I. THE DYNAMICS OF THE AGRICULTURE VALUE ADDED OF COUNTRIES OF THE WORLD, 2012-2016, MLN. USD (IN ACTUAL PRICES)

Countries name	2012	2013	2014	2015	2016	Structure, 2015, %
World in general	3075855.2	3282276.0	3333716.5	3174669.9	3177208.8	100.0
China	806398.6	893009.8	949694.0	977311.9	958246.7	30.78
India	307872.5	318398.6	338376.8	335784.3	353620.3	10.58
USA	194255.0	230399.0	210715.0	183721.0	-	5.79
Indonesia	122755.7	121883.1	118805.8	116192.3	125410.0	3.66
Nigeria	100419.9	106899.9	113644.4	99253.1	84908.7	3.13
Brazil	102757.2	111446.1	106236.7	77025.2	84610.8	2.43
Pakistan	53201.9	55104.3	58022.4	64701.9	67478.2	2.04
Turkey	67757.7	63930.6	61559.1	59244.9	52326.1	1.87
Russia	68720.6	74175.6	73013.4	55921.1	54791.6	1.76
Japan	70828.0	56928.8	51174.8	46408.7	-	1.46
Iran	45868.5	45814.4	38900.4	41250.7	-	1.30
Mexico	40495.9	42707.9	43573.0	39107.7	37713.0	1.23
France	43785.5	41003.3	44038.3	37546.3	32515.3	1.18
Egypt	31493.0	32536.2	34640.1	37431.4	39595.9	1.18
Italy	40727.4	44630.9	41761.2	36995.7	34918.0	1.17
Thailand	45747.1	47606.8	40953.3	34824.8	33919.5	1.10
Vietnam	29950.8	30757.6	32956.7	32835.9	33066.2	1.03
Australia	35188.7	36288.1	32739.4	32097.5	29355.0	1.01
Canada	30051.4	31790.7	-	-	-	-
Sudan	22579.1	24331.3	26166.3	30525.1	36456.1	0.96

^a Source: summarized by the authors [1, 10, 11].

Among the countries of the world, China (\$ 958.2 billion) and India (\$ 353.6 billion) occupies the largest share in the agricultural production value added. Their shares of these countries in global production in 2015 have been 30.78 % and 10.58 %. The USA, Indonesia, Nigeria, Brazil, Pakistan, Turkey, and Russia are among the leaders in the agri-food industry. Significant volumes of production in these countries are largely determined by the size of countries; therefore, it is expedient to calculate relative

indicators for assessing the extent of the agrarian sphere development. It is worth paying attention to the fact that the agriculture added value in China is only 1.27 % of the country's total GDP, and since 1995 this indicator has a steady downward trend. In India, this indicator has been accounted for 32.57 % of GDP, which scows a significant dependence of the country on agriculture.

According to the regions of the world, the largest volumes of production are attributed to the countries of East Asia and the Pacific. In the least developed countries (UN classification), this indicator is 26 %. The smallest share of agriculture is formed in the value added of the countries of North America and the Eurozone – 1.5 %. For low-income countries in Europe and Central Asia this indicator is slightly higher – 6.2 %. The share of agriculture in East Asia and the Pacific is 5.2 % (see Fig. 3).

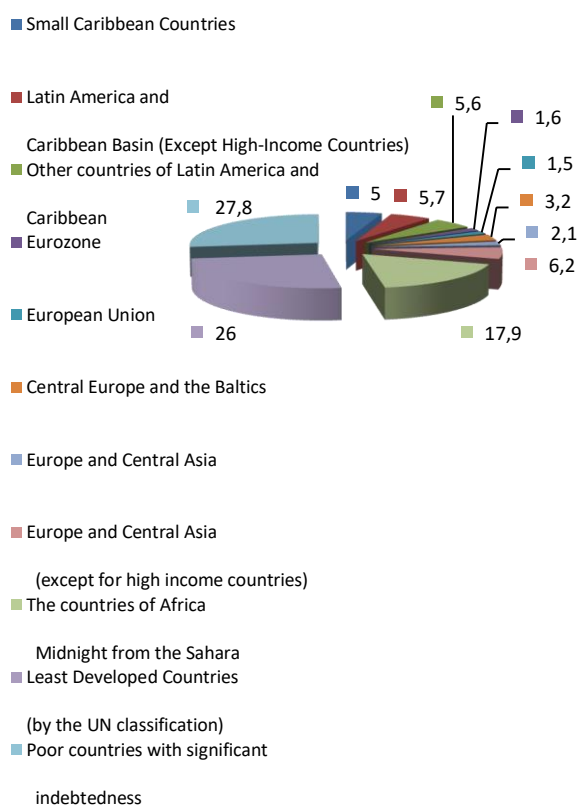


Fig. 3. Share of agriculture added value by regions of the world, %, 2016
Source: summarized by the authors [1, 10, 11].

Agriculture has been the largest share in GDB of such countries as Sierra Leone – 61.4 %, Chad – 50.1 %, Central African Republic – 42.9 %, Togolese Republic – 41.3 %, Mali – 40 %, and other countries of Central Africa, Central and East Asia, where agriculture accounts for more than 25 %.

Consequently, the volumes of agricultural products in the world have being constantly increased. These trends have been driven by an increase in demand for these products due to the growing number of people in the world. At the same time, in developed countries, the share of agriculture value added has been decreased, which is due to the development of other areas with a high share of value

added. It has been found that poor countries have a high share of agriculture.

Albania has been depended on agriculture the most in comparison with other European countries. A share of agriculture in a GDP of Albania has been 21.83 %. The country has been specialized in growing corn and wheat and tobacco and cotton. Moldova occupies a second place in the ranking is (13.8%), agri-industrial complex has a half of the export in the structure of foreign trade country. Ukraine has been occupied a third place with an agriculture share of 10.43 % in GDP.

Countries dependent on agriculture have been included Macedonia, Montenegro, Serbia, Belarus, Bosnia and Herzegovina, Bulgaria, and Romania, with the share of agriculture accounting for 10.2 % to 6.4 %, respectively. European countries have been grouped using the cluster analysis methodology based on aggregate indicators of development, including the share of agriculture in GDP, nominal GDP and GDP per parity of purchasing power (PPP) per capita, country's territory, and population (Table 2).

TABLE II. CLUSTERS OF EUROPEAN COUNTRIES FOR THE LARGEST SHARE OF AGRICULTURE IN THE STRUCTURE OF GROSS DOMESTICS PRODUCT

Clusters	Countries	% agriculture in GDP	GDP nominal, million \$	GDP PPP, million \$	Population, thousands of people	Territory, km ²	population density, people / km ²	GDP nominal, \$ per people	GDP PPP, \$ per people
Cluster 1	Ukraine	10.43	83550	347885	42620	577500	74	1960	8162
	Romania	6.40	186514	441032	19760	238391	83	9439	22319
	Belarus	9.20	48126	165363	9505	207595	46	5063	17397
Cluster 2	Bulgaria	6.70	50446	143102	7144,6	110994	64	7061	20029
	Serbia	9.66	37755	101458	7076,4	88361	80	5335	14338
	Montenegro	10.10	4242	10613	621,8	13812	45	6822	17068
Cluster 3	Macedonia	10.20	10492	30127	2071,3	25713	81	5065	14545
	Bosnia and Herzegovina	8.45	16532	42529	3861,9	51197	75	4281	11012
	Moldova	13.80	6650	18539	3553	33846	105	1872	5218
	Albania	21.83	12144	34214	3038,6	28748	106	3997	11260

^b. Source: developed by the authors

Among the studied countries, Romania has been the highest socio-economic development indicators, however, the share of agriculture in GDP has been given this country the tenth (last) place in the ranking. Leader countries in terms of agriculture's share of GDP have been grouped into three clusters. The first cluster brings together three countries – Ukraine, Romania, and Belarus. The size indicators, namely, the largest area, population, as well as nominal GDP and its indicator of purchasing power have been the dominant characteristics of these countries. Ukraine has been belonged to the first cluster because it has the largest territory and population, while the qualitative

indicator – GDP per PPP per capita in Ukraine is one of the lowest.

The second cluster (Bulgaria, Serbia, Montenegro) has been characterized by an average share of agriculture in GDP, average indicators for the size and GDP per capita GDP (Bulgaria, Serbia). Montenegro is the smallest among the studied countries in absolute aggregates. This country has been high relative indicators; in particular GDP per PPS per capita, therefore this country entered the second cluster. The third cluster brings together four countries (Macedonia, Bosnia and Herzegovina, Moldova, Albania). These countries have been the highest share of agriculture in GDP and the lowest GDP per capita GDP per capita. In Macedonia, the main areas of agricultural production have been vegetable growing, horticulture, sheep breeding, and also cultivating wheat, corn, sunflower, tobacco, rice, cotton, grapes. In agriculture sphere of Macedonia, about 20 % of the population work. Bosnia and Herzegovina has been specialized in the cultivation of corn, sugar beet, wheat, tobacco, grapes, fruits and vegetables, and breeding sheep and goats (see Fig. 4).

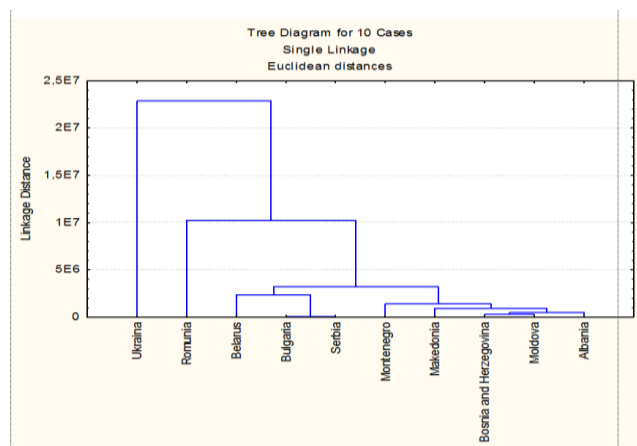


Fig. 4. Clustering dendrogram of European countries by aggregate development indicators, 2016

Source: developed by the authors

Correlation-regression analysis made it possible to find out that the relationship between the share of agriculture in GDP and GDP per capita is low, as indicated by the correlation coefficient of 0.551; by 30.3 %, the change in GDP per capita is due to the above factor, as indicated by the determination coefficient; Fischer's criterion is $F(3,197) = 3.48$, which indicates the high quality of the model and the possibility of its use for forecasting.

Thus, the agricultural sector plays an important role in the countries development. However, this economy's sphere should be only the basis for meeting the food needs of the country's citizen and of all humanity.

III. CONCLUSIONS

Consequently, the global volume of world agricultural production is constantly growing. The volumes growth index of world agricultural production in 2016 compared to 2015 has been, respectively, 1.001 and 1.017 in actual and constant prices. The leaders in agricultural production have been China, India, and the USA. These countries have considerable territorial potential for the development of the

agricultural sector. In addition, countries such as China and the US are using intensive technologies to increase agricultural output.

Using cluster analysis has been allowed to group European countries by indicators of globalization development and the place of agriculture in the country's economy. The analysis has been emphasized that a significant proportion of agriculture does not determine the high socioeconomic level of development of countries. Therefore, for its increase due to the development of the agrarian sector, it is necessary to use the reserves of efficient production of goods with high added value or unique products that could be par value for the price.

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