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OPTIMIZATION OF CIRCULATING ASSETS STRUCTURE OF AGRICULTURAL ENTERPRISES

Statement of the problem. In the conditions of the market economy one of the most important tasks of any agricultural enterprise is maximization of net income. Along with this, it is important to determine how effectively the assets of the object are used which can be reached by calculation of the turnover duration indices in days.

The acceleration of circulating assets turnover has a great economic significance, because it reduces the need of production in this resource for the industrial program and thus increases the efficiency of the reproductive process. The funds which were released can be directed to manufacture diversification, staff social development, etc. by a company[1].

Analysis of the recent investigations and publications. The investigation of the circulating asset structure at agricultural enterprises and tendencies of its optimization are kept under observation of many scientists, including V.H. Andrijchuk [1], I.V. Bezp'yata [2], I.A. Blank [3], O.A. Burbelo [4], O.V. Dejneko [5] N.O. Okselenko [6], O.V. Ulyanchenko [7], etc. However, application of economic and mathematical methods under circulating assets structure improvement is not investigated deeply enough and it causes the urgency of the stated questions.

Formulation of the aims of the article. The aim of the article is to work out a technical approach of circulating assets structure optimization at agricultural enterprises on the base of economic and mathematical modeling.

The main investigation material statement. The practice of economic investigations realization proves that the most effective instrument of economic processes and phenomena optimization is working out and introduction of economic and mathematical models among which optimized models take an important place.

Optimization model of the components system that make the circulating assets must provide: maximum income which is received on one unit of the circulating assets as a result of industrial, financial and investment activity;

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minimal risk, connected with costs deposit to individual components of the circulating assets; specified level of an enterprise solvency [4].

Optimization of the circulating assets structure can be placed under various objective functions in two directions – change of the assets structure or the sources of their formation. Thus, O. V. Dejneka proposes minimization of financial resources value necessary for completion of the circulating assets as an objective function [5]. N.O. Okselenkouses a sum of circulating expenses and also expenses on attraction and service of the used sources of current assets formation [6]. I.V. Bezp'yatacarries out minimization of industrial expenses including separate kinds of industrial reserves in the groups of private and lease enterprises in her investigations [2].

However, all the above mentioned objective function do not have scientifically based norms of floating assets volume, they do not fully include indices provision of proper financial state of an agriculture enterprise that leads to setting of some other optimization task.

The main theorem of the line programming theory states that under the conditions of optimal development of a line programming task, it will surely coincide with at least one of the supporting plans. If an optimal solution is reached by two or more different supporting plans, it will be optimal under any plan which is socalled linear convex combination of optimizing plans [7].

So,let's put the task of rational structure formation of the circulating assets of LTD "Krasnogradske Dzherelo" of Krasnograd Region, Kharkiv Oblast'. Let x_j –be the value of j -king of the circulating assets, $j = 1, 2, \dots, n$; B_j – is receipts including impact coefficient of j -kindassets to its amount, which were set with help of correlative and regressive analysis (C_j); including restrictions as to general cost of the assets (A), the most minimal amount of the assets, necessary for an enterprise to operate (\min_j),calculated norms of assets value that an enterprise has which were proved by us in the dissertation (H_j)and restrictions of variables inherence, because from an economic point of view they can not be less than a zero.

In accordance to the task setting it is necessary to determine the receipts size to maximize their reversibility (to shorten turnover length) for an improved structure of the circulating assets.

So, a purpose function of the taskis as follows:

$$Z = \sum_{j=1}^n B_j x_j \rightarrow \max, \quad (1)$$

$$B_j = \sum B * C_j$$

considering restrictions:

$$\begin{cases} \sum x_j = A, \\ \min_j \leq x_j \leq H_j, \\ x_j \geq 0. \end{cases} \quad (2)$$

Mathematical expression of an objective function of the rational structure of the circulating assets has led to such equation:

$$Z = B_1 x_1 + B_2 x_2 + B_3 x_3 + B_4 x_4 + B_5 x_5 + B_6 x_6 + B_7 x_7 + B_8 x_8 + B_9 x_9 + B_{10} x_{10} + B_{11} x_{11}, \quad (3)$$

where x_1 is the average annual value of raw materials, building materials, spare parts, low-value and quick-wearing things, thousands of hrn.;

x_2 is average annual value of fuel and oil materials, thousands of hrn.;

x_3 is average annual value of seeds and planting material, thousands of hrn.;

x_4 is average annual value of mineral fertilizers and plant protection remedies (fungicides), thousands of hrn.;

x_5 is average annual value of fodder crops, litter and medicines, thousands of hrn.;

x_6 is average annual value of current biological assets of cattle breeding, thousands of hrn.;

x_7 is average annual of incomplete production, thousands of hrn.;

x_8 is average annual value of integrated products, thousands of hrn.;

x_9 is average annual value of accounts receivable, thousands of hrn.;

x_{10} is average annual value of monetary costs and current financial investments, thousands of hrn.;

x_{11} is average annual value of other circulating assets, thousands of hrn.

As a result of optimization (Table) the average annual value of industrial reserves increased by 124.1 thousands of hrn.

Comparison of the actual structure of the circulating assets of LTD "Krasnogradske Dzherelo" of Krasnograd Region, Kharkiv Oblast' in 2012 with a rational structure of the economic and mathematical optimization model

Elements of circulating assets	The actual data 2012		Expected values according to economic and mathematical model		Deviation(+, -) expected values of actual data:	
	Average annual value, thous. grn.	Share, %	Average annual value, thous. grn.	Share, %	Average annual value, thous. grn.	Share, %

Industrial reserves	831,4	20,7	955,5	23,8	+124,1	+3,1
Current biological assets	1273,7	31,7	986,7	24,5	-287,0	-7,2
Incomplete production	719,6	17,9	1073,2	26,7	+353,6	+8,8
Integrated products	738,6	18,4	430,6	10,7	-308,0	-7,7
Account receivables	212,1	5,3	62,2	1,5	-149,9	-3,8
Monetary costs and financial investments	78,4	2,0	512,3	12,7	+433,9	+10,7
Other circulating assets	166,7	4,1	0,0	0,0	-166,7	-4,1
Circulating assets- total	4020,5	100,0	4 020,5	100,0	x	x
Net in come, thousand hrn.	7040,1	x	13054,4	x	+6014,3	x
Turnover coefficient	1,751		3,247		+1,496	
Length of circulating assets turnover, days	206		111		-95	

Source: personal calculations

The average annual of incomplete production increased to 353,6 thousands of hrn, value of current biological assets of cattle breeding is decreased to 287,0 thousands of hrn. Positive is cost reduction of the average annual value of integrated products to 308,0thousands of hrn., accounts receivable to 149,9 thousands of hrn. So, optimal for agricultural enterprises is the following structure of circulating asset: assets in the circulating – 25,0 %; industrial reserves – 24,0 %; current biological assets – 24,0 %; incomplete production – 27,0 %.

Conclusions. As a result of the investigation of the circulating assets structure optimization, we worked out the economic and mathematical model which was lested in the conditions of LTD "KrasnogradskeDzherelo" of Krasnograd Region, KharkivOblast'. Receipts optimization including impact coefficients on the separate elements volume of the floating assets which were calculated with help of correlative and regressive analysis was set as principles. The length of circulating assets turnover in accordance with assets structure which is obtained with help of the economic and mathematical model is 95 days shorter than the model which the enterprise had in 2012. Scientifically grounded normatives of the separate elements of the circulating assets were added tj the model for the first time that provides approach to normative indices sense.

Bibliography: 1. Andrijchuk V.H. Economics of agricultural enterprises: a textbook / V.H. Andrijchuk. – K.: Kyiv National Economic University, 2013. – 779 p. 2. Bezp'yata I.V. Increaseof an effective utilization of turnaround

means in the private and private-rent agricultural enterprises: the dissertation on competition of a scientific degree of the candidate of economic sciences: 08.07.02 / I.V. Bezp'yata. – Nikolaev state agrarian university. – Nikolaev, 2007.– 20 p. 3. Blank I.A. Financial management: a training course / I.A Blank. – K.: Elga, Nick Center, 2004. – 656 p. 4. Buberlo O. Evaluating of the effeiciency of the use of current assets / O. Buberlo, O. Zueva // Economy of agricultural complex. – 2008. – № 11. – p. 50-53. 5. DejnekaO. Optimization of circulating assets completion the enterprise / O. Dejneka, K. Yurchenko // Innovation Economy. – 2012. – № 3 [29]. – p. 257-260. 6. Okselenko N.O. Increase of an effective use of current assets of agricultural enterprises / N.O. Okselenko // The materials of Internet- conference "Modern problems and solutions in science, transportation, production and education, 2012" – Issue 4, Volume 32. – Odessa: Kupryenko, 2012 – 100 p. 7. Ulyanchenko O.V. Operations research in the economy: a textbook / O.V. Ulyanchenko. – Sumy: Environment, 2010. – 594 p.

Василишин С.И. Оптимизация структуры оборотных средств сельскохозяйственных предприятий. В статье предложена экономико-математическая модель оптимизации структуры оборотных средств сельскохозяйственных предприятий, которая учитывает рационально обоснованные их нормы, ограничения по нормативам платёжеспособности и ликвидности, минимизирует влияние инфляции.

Василишин С.І. Оптимізація структури оборотних коштів сільськогосподарських підприємств. У статті запропонована економіко-математична модель оптимізації структури оборотних коштів сільськогосподарських підприємств, яка враховує раціонально обґрунтовані їх норми, обмеження по нормативах платоспроможності і ліквідності, мінімізує вплив інфляції.