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АНАЛІЗ ВЗАЄМОЗВ'ЯЗКУ МІЖ ФІНАНСОВИМИ РЕЗУЛЬТАТАМИ ВИРОЩУВАННЯ ЗЕРНА І ТЕХНОЛОГІЧНИМИ ВИТРАТАМИ

Abstract. *The relationships between individual factors that have a significant effect on the formation of financial results were determined. It has been established that the highest costs are not always accompanied by the highest profit, which calculated per 1 hundredweight of grain. It has also been proved that the maximum level of costs, which calculated per 1 hectare of grain crops, does not always lead to the formation of the highest level of grain profitability.*

Formulation of research objectives. *Investigation of relationship between technological costs and financial results of growing crops***.**

Conclusions and recommendations for further research. *Thus, it can be argued that the costs on productivity growth and, ultimately, financial results should focus on the production of those products that bring more income and increase the usage of those types of resources that pay off by increasing gross outcomes.*

Keywords: *Financial results, profit, profitability, direct technological costs, yield, sales price, grouping, interconnection between the factors of cost formation.*

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ANALYSIS OF INTERACTION BETWEEN FINANCIAL RESULTS OF GROWING GRAIN AND TECHNOLOGICAL COSTS

Abstract. *Визначені взаємозв'язки між окремими факторами, які суттєво впливають на формування фінансових результатів. Встановлено, що самі високі витрати не завжди супроводжуються самими високими показниками прибутку, що припадає на 1 ц зерна. Також доведено, що максимальний рівень витрат в розрахунку на 1 га посіву зернових культур не завжди призводить до формування найвищого рівня рентабельності зерна.*

Keywords. *Фінансові результати,прибуток, рівень рентабельності, прямі технологічні витрати, урожайність, ціна реалізації, групування, взаємозв'язок між факторами формування собівартості.*

Formulation of the problem. The improvement of financial results in the cultivation of grain crops is generally associated with growth in the cost of technological operations, which is due to increase of prices of fuel, mineral fertilizers, plant protection products, wage growth and other direct costs. However, there are a number of factors that indirectly affect the level of yield and quality of grain products. It would be advisable to calculate all the factors that have the impact on yield and quality – the main components in affecting the price of products, to optimize the cost of cultivating grain.

Analysis of recent research and publications. Domestic scientists such as Baryshevskaya I.V., Divnich O.D., Demidenko L.M., Makarenko P.M., Melnyk L.Yu., Petrov V.M., Prus Y.O., Svitovyi O. M. Tkachuk, V. I., Tokar A.V. investigated the factors of costs formation for agricultural products and, first of

all, grain. Found out the most influential and in a variety of grain growing conditions. Meanwhile, there are many problems associated with the mutual influence of factors on the level of productivity and, as a consequence, on the financial results, which need to be solved based on the zone of production, technology, availability of resources and other factors.

Formulating the goals of the article. Investigation of relationship between technological costs and financial results of growing crops.

Presentation of the main material. Growth of crop production also depends on, first of all, increase of crop productivity. Economic research, as well as the work of many agricultural scientists, shows that a high level of crop yield can only be achieved with a high level of agriculture, by using of mineral fertilizers and plant protection products, by applying of high quality seeds, which implies the need of additional costs.

In the production of grain, sunflower seeds and other crops a three-four-fold increase in profit is achieved by the use of intensive technologies with the growth of aggregate costs on 1 hectare by 20-60% together with ensuring timely payback of additional investments [1, p.12].

The production and sale of grain for the agricultural enterprises in southern Ukraine, a dry steppe zone and a risk-prone area of agriculture, have a particular importance because the grain industry is the leading for the vast majority of agricultural enterprises occupying a share about 70% in the structure commodity products for the majority of enterprises in the region.

Therefore, calculations of the approaches to increase productivity and how production costs impact on it are given on the example of this particular industry. 28 farms in the district that grow crops are taken into account.

But first of all we shall show on a concrete example of the leading enterprise of the district the share of grain in the structure of crops over a three-year period (Table 1).

Table 1

Dynamics of sown area, yield and gross grain production in a leading agrarian enterprise, 2016-2018.

Indicators	Years			2018 in % to 2016
	2016	2017	2018	
Sown area, thousands of ha	1351	1433	1326	98,15
Share in total crop area, %	64,8	70,73	67,17	103,66
Yield per 1 ha, cwt	38,12	38,51	42,45	111,36
Gross grain production, thousands of cwt	51494	55190	56283	109,30
incl. per 100 ha of cultivated lands, cwt	2119	2289	2342	110,52

Sown areas with grain crops slightly fluctuated within 6-8% during the investigated period. However, the share of grain in the structure of crops over the past three years increased by 2.4%. In 2017, their share was almost 71%, which is a significant violation of the scientifically grounded approach to the formation of the sown areas structure in the farms of the steppe zone of southern Ukraine, according to which the share of grain should not exceed 60%. The gross grain harvest increased by 9.3% (calculating per 100 hectares of cultivated lands – by 10.52%) mostly because of the increase of crop yields.

Such disproportions in the crops area structure can be explained by the high demand in grain and desire of managers to improve the economy of enterprises with the help of the grain industry.

An important reserve for strengthening of the financial results is to increase the economic efficiency of production. It is necessary to investigate how the growth of productivity is reflected in the enterprise financial results. Data of table 2 show that growth of the average sown area leads to rise of yields.

Table 2

Influence of grain crop yield on grain production efficiency in agrarian enterprises of the district, 2018

Indicators	Groups of enterprises by grain crops yield level, cwt per ha				District average	Leading district enterprise
	I up to 27 cwt/ha	II 27-39 cwt/ha	III 39-51 cwt/ha	IV over 51 cwt/ha		
Number of enterprises	12	8	5	3	x	x
Crop yield, cwt/ha	358	858	1233	315	653	1326
Average sown area in group, ha	23,9	32,2	44,8	58,3	35,9	42,4
Production costs per 1 ha, UAH	6722,53	7695,20	8725,33	12946,7	8285,62	6343,13
Cost of 1 cwt of grain, UAH	189,12	216,15	258,53	203,33	237,07	162,04
Selling price of 1 cwt of grain, UAH	331,66	310,84	342,19	328,51	329,05	345,91
Profit per 1 ha of grain crops area, UAH	1204,14	2313,85	6604,78	6205,41	3527,28	8323,45
Profit per 1 cwt of grain, UAH	142,54	94,69	83,66	125,18	91,98	183,87
Level of grain production profitability, %	75,37	43,81	32,36	61,56	38,80	113,47

As it shown, enterprises with an average area of 358 hectares were included to the first group which consists of twelve farms. The average yield in this group was 23,9 cwt/ha. Average production costs per 1 ha are the lowest and equal to 6722,53 UAH. As a result, the cost of 1 cwt is the highest and constitutes 189,12 UAH. The selling price, however, is also the highest, which is 331,66 UAH. The profit was calculated per 1 hectare and 1 cwt respectively 1204,14 UAH and UAH 142,54, which is the worst result among others. The profitability level was 75,37%.

The average area of sowing in the second group, which includes eight enterprises, is 858 hectares with an average yield of 32,2 cwt per hectare. Expenses in this group per 1 hectare more than in the 1st on 14,5%. Meanwhile, the cost of 1 cwt of grain is 216,15 UAH which is less than in the 1st group by 14,3%. Despite the lower selling price (UAH 310,84), the profit per hectare and 1 cwt is higher in 1,9 and 33,57%, respectively. The level of profitability is almost 31,56 p.p lower than in the 1st group.

The third group included five enterprises with an average sown area of 1233 hectares. The yield in this group is 44,8 cwt/ha. The costs per one hectare are almost 1030,13 UAH more than in the 2nd group. The average selling price is 342,19 UAH. Received profit per 1 ha and 1 cwt is respectively 6604,78 UAH and 147,53 UAH. The profitability level is the highest of all groups and is 75,79%.

The 4th group includes three enterprises with an average crop area of 315 hectares. The yield on average in the group is 58,3 cwt/ha which is significantly higher than in the other three groups. The costs per 1 hectare are 12946,72 UAH. However, the costs of 1 cwt of grain are only 44,46% below than in the third group. The average selling price is 328,51 UAH/cwt. Received profit per 1 ha and 1 cwt is respectively 6205,41 UAH and 125,18 UAH. The profitability level is slightly lower than in group 3 and is 48,06%. Average data for all enterprises in the district is close to the data of the third group. Data on the received profit per 1 hectare and 1 cwt is significantly different.

These figures are equal to 3527,28 UAH respectively and 91,98 UAH.

The investigated enterprise significantly differs from region average. By the level of productivity it belongs to the 3rd group. But it has a sown area of 1326 hectares and much lower costs per 1 hectare – 6343.14 UAH. The cost of 1 cwt of grain is 162,04 UAH, the price of sale – 345.91 UAH. The profit is calculated per 1 hectare and 1 cwt respectively 8323,45 UAH and 183,87 UAH. The profitability level is 113,47%.

The data in Table 2 give grounds for arguing that in order to increase yields it is necessary to increase the costs per hectare of sown area or to reduce the crop area to scientifically justified sizes and to concentrate all available resources in this area. The grouping of enterprises by the level of productivity shows that the additional costs per 1 hectare of sown area affect the growth of crop yields and, respectively, indicators of economic efficiency only to a certain edge.

Expenses in the 4th group are bigger than in the first one in twice while yield is higher in 2,4 times. At the same time, the profitability level is more than in the 1st group at 34,78 percentage points.

Table 3

Impact of production costs per hectare of grain crops on grain production efficiency in agrarian enterprises of the district, 2018

Indicators	Groups of enterprises by grain production costs level, UAH per ha				District average	Leading district enterprise
	I up to 5300 UAH /ha	II 5300-8300 UAH /ha	III 8300-11300 UAH /ha	IV over 11300 UAH /ha		
Number of enterprises	5	11	10	2	x	x
Production costs per 1 ha, UAH	4186,47	6409,06	9456,42	138998,5	8085,62	6343,14
Average sown area in group, ha	324	571	977	298	653	1326
Costs of 1 cwt of grain, UAH	189,12	216,15	258,53	203,33	237,07	162,04
Selling price of 1 cwt of grain, UAH	255,9	327,93	337,1	337,1	329,05	345,91
Costs of crop production, thousands of UAH	11924,3	95075	224987,0	35632,7	367619	14917
Share of grain production costs in total costs of crop production, %	56,84	42,41	41,07	23,25	40,2	56,39
Grain yield, cwt/ha	28,22	29,42	39,84	59,2	35,9	42,4
Received profit per 1 ha of grain crops areas, UAH	3035,28	3238,6	3973,64	6065,47	3727,28	8323,4
Received profit per 1 cwt of grain, UAH	66,78	111,78	78,57	133,77	91,98	183,87
Level of grain production profitability, %	35,31	51,71	30,39	65,79	38,80	113,47

Grouping of enterprises by level of production costs proves the following.

The first group included five enterprises with an average area of 324 hectares. The costs per

hectare of crops were UAH 4186,47. At a yield of 28,22 cwt/ha, the costs were 189,12 UAH /cwt. Grain sold at a price of 255,9 UAH/cwt. The received profit per 1 hectare and 1 cwt was respectively 3035,28 UAH and 66,78 UAH. The profitability level was 35,31%.

The second group consists of 11 enterprises with an average area of 571 hectares. Costs per hectare were 6409,06 UAH and at a yield of 29,42 cwt per hectare, they generated the average costs of 216,15 UAH/cwt. The average selling price of grain was 327,93 UAH/cwt. Profit per 1 hectare and 1 cwt was 3238,6 UAH and 111,78 UAH. The level of profitability is the highest among all groups and equal to 51,71%.

The third group includes 10 enterprises with an average area of 977 hectares. The level of expenses per 1 ha is 9456,42 UAH. With a yield of 39,84 cwt/ha, the average costs are 258,53 UAH/cwt. The average selling price is the highest of all groups and is 337,1 UAH/cwt. Accordingly the profit per 1 hectare and 1 cwt is 3973,64 UAH and 78,57 UAH. The profitability level is 30,39%.

The fourth group includes 2 enterprises with a sown area of 298 hectares. The average costs are 13898,85 UAH per 1 hectare. At a yield of 59,2 cwt/ha, the costs are 203,33 UAH/cwt. At an average selling price of 337,1 UAH/cwt, the profit per 1 hectare and 1 cwt is respectively 6065,47 UAH and 133,77 UAH. The profitability level is 65,79%.

The average area data is as follows. The average costs are 8085.62 UAH per 1 hectare. The costs of 1 cwt of grain at a yield of 35,85 cwt/ha are 237.07 UAH/cwt. The grain was sold at an average price of 329.05 UAH/cwt which allows to receive profit per 1 hectare and 1 cwt respectively 77010.1 UAH and 76.74 UAH. The profitability level is 38.80%.

The leading investigated enterprise belongs to the 2nd group by the level of costs but has better indicators like cost of 1 cwt of grain and its sales prices – respectively 162.04 UAH and 345.91 UAH. It should also be noticed that a large part of circulating assets of the enterprise is concentrated in the grain industry. Therefore, the level of profitability in comparison to the average data of the district is better by 74,67 percentage points.

Correlation analysis of relationship between yield and direct costs in general, usage of mineral fertilizers, direct labor remuneration and usage of fuel and lubricants per 1 hectare shows that the connection between yields on the one hand and direct costs in general, costs on mineral fertilizers, payment and seeds are more robust than between crop yields and costs on fuel on the other hand (Fig. 1, 2, 3, 4, 5).

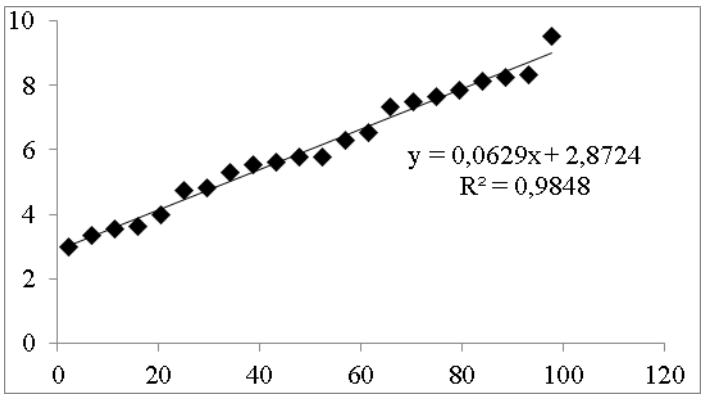

Fig. 1. Correlation between crop yield and direct production costs per 1 hectare

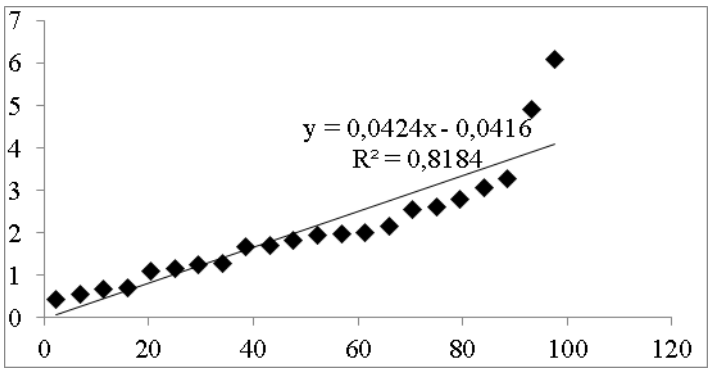

Fig. 2. Correlation between crop yield and usage of mineral fertilizers per 1 hectare

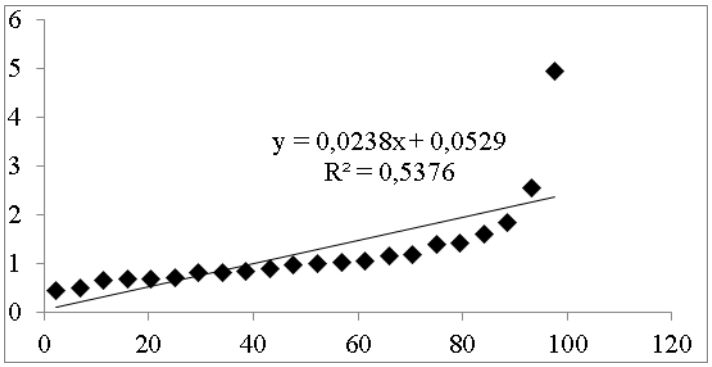

Fig. 3. Correlation between crop yield and fuel consumption per 1 hectare

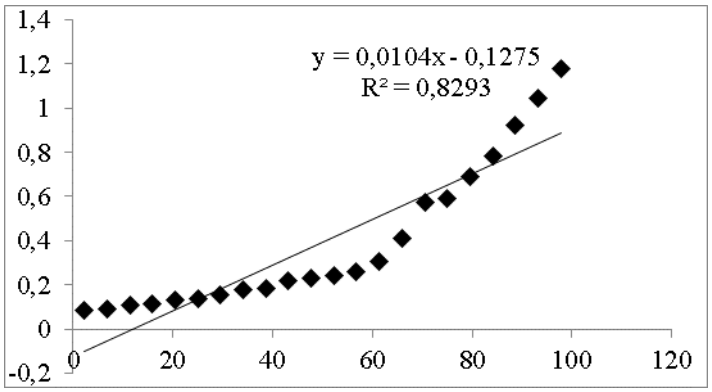

Fig. 4. Correlation between crop yield and labor costs per 1 hectare

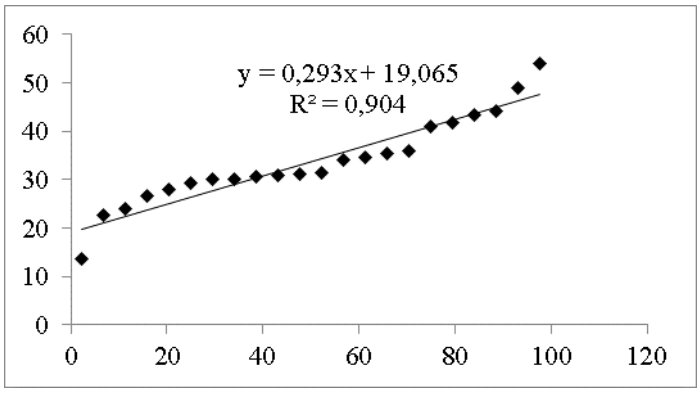

Fig. 1. Correlation between crop yield and costs on seeds per 1 hectare

Quality of grain products is a direct consequence of a thorough implementation of all agrotechnological operations and is reflected in the prices of sales. Factor analysis of changes in profit revealed the prevailing influence of selling prices compared with the rest of the factors such as a full cost or sale volumes.

The relationship between productivity and technological costs may have different levels of density driven by the active usage of energy- and resource-saving technologies (no-till, mini-till, strip-till) as well as the usage of advanced technology with the GPS navigation system. Under these conditions the influence of some factors increases while others decrease.

Conclusions and recommendations for further research. Thus, it can be argued that the costs on productivity growth and, ultimately, financial results should focus on the production of those products that bring more income and increase the usage of those types of resources that pay off by increasing gross outcomes.

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