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ECONOMIC AND ENERGY EVALUATION FOR FOREIGN SYSTEM OF MACHINES IN SUGAR BEETS PRODUCTION

Abstract. *Economic and power charges are investigated on the production of sugar beets with the using the machines system of foreign production. The calculation of break-even level of sugar beets production (at the different level of the productivity) is carried out taking into account*

the economic and power indicators of production efficiency for the agricultural enterprises of Forest-Steppe zone.

Keywords: *sugar beets, system of machines, economic efficiency, power efficiency.*

The Problem Statement. Over the past 20 years the technical support of Ukrainian agricultural sector is characterized by a significant deterioration of quantitative and qualitative parameters. The vast majority of existing tractors, beet harvesting machines, planters and other farm machinery and implements is obsolete and physically worn out. And there is practically no update that affects the timeliness and quality of technological operations in the sugar beet production.

The Analysis of mains researches and publications. The question about the economic efficiency of foreign machinery and technology for the sugar beet production is discussed in separate publications [1 – 5]. However, insufficient knowledge of the problem and its practical importance require optimization of the composition and structure of machines considering its productivity, energy efficiency, regional soil and climate characteristics, aimed at improving the economic and energy efficiency of sugar beet production.

Forming purposes of article. The purpose of this publication is to highlight scientific research results and practical recommendations to improve the economic and energy efficiency of sugar beet production (with the use of foreign system of machines) for agricultural enterprises of Forest-Steppe zone.

Research results. According to the agricultural enterprises of Poltava region and summaries of scientific papers, the author found that the use of foreign system of machines reduces labor costs by 35 – 50%, the fuel consumption – by 25 – 35% metal contain – 20 – 30%. It should be efficient tractors aggregation, i.e. the unit's collection of such a number of machines or working bodies in them, and adhere to the following operating speed under which the highest productivity and lowest circulating assets costs are achieved in specific conditions without reducing the quality of work. Fuel consumption could be reduced by 10 – 60% with the proper aggregates selection. The use of arable aggregates according the "drag – pull" scheme, when several frames are placed on the front, and the other on the back

mounted system provides fuel savings up to 10 – 20% compared with traditional aggregates.

The evaluating the effectiveness of sugar beet harvesting shows that the most efficient way is a streaming way during favorable weather conditions and a relatively pure sugar beet sowing agrofond, and a transit way – under unfavorable weather conditions or insufficient number of vehicles. The sugar beets transportation at a distance of over 30 km is impractical because transport costs and physical products losses are increased, as well as sugar content is reduced. Transport costs can be reduced if applied felling and harvesting streaming method. During sugar beets transportation the most productive and energy efficient are heavy trucks with a diesel motor, which spend fuel in 2.5 times less for a 1 ton than the medium-side trucks. The transport trains using provides fuel savings of 20 – 30% compared with single aggregates and higher machine productivity by 40 – 50%.

According to Poltava Region farms' data the author evaluated the economic and energy costs, and defined the production costs structure of sugar beets production with foreign machines system for agricultural enterprises of Forest-Steppe zone. Thus, the largest share in the cost structure belongs to the costs for purchasing fertilizers and plant protection products, as well as for salaries (19.9%, 18% and 17.5% in accordance). The use of high-productive machines system of foreign production helps reduce the fuel costs to 10.3% (Fig. 1).

The calculation of the economic and energy costs incurred to sugar beet production with the using the machines system of foreign production for agricultural enterprises of Forest-Steppe zone indicates that the costs for 1 ha of sugar beets are 5733.06 UAH, energy costs are 35540 MJ / ha, the output costs are 10745 UAH / ha, the total energy accumulated in the crop is127871.1 MJ / ha (Fig. 2).

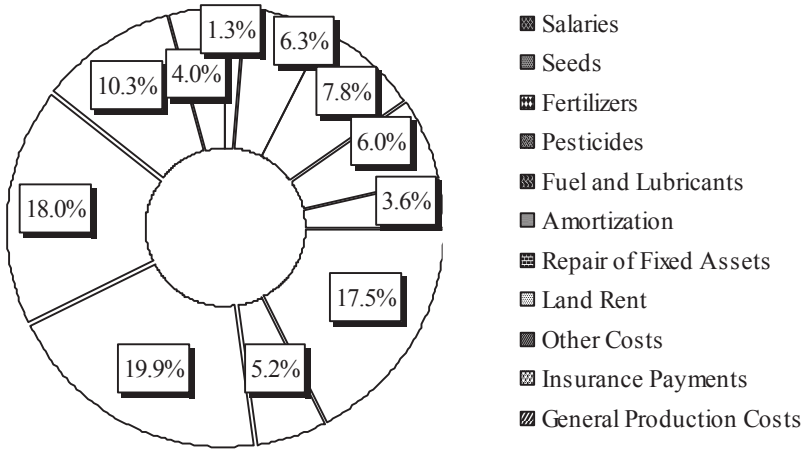
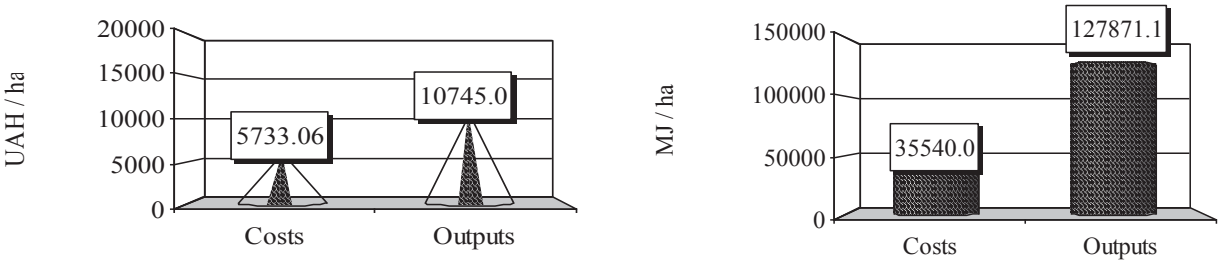


Fig. 1. The costs structure of the sugar beets production with the using foreign machines system for agricultural enterprises of Forest-Steppe zone in 2013, % [1)]

[1)] the projected yield is 500 kg / ha

Source: Calculated by the author



a) b)

Fig. 2. Value (a) and energy (b) production effect of the using the machines system of foreign production for agricultural enterprises of Forest-Steppe zone in 2013[1)]

[1)] the projected yield is 500 kg / ha

Source: Calculated by the author

In order to reduce costs and energy expenditures it is advisable to calculate break-even level of sugar beets production (with different productivity levels) the using the machines system of foreign production (Table 1).

Table 1

Indicators of economic and energy efficiency of sugar beets production using foreign manufacturers of machines for farms in the steppe zone 2013

Indicators	Yield, ctr / ha					
	500.0	400.0	300.0	267.0	200.0	139.0
Production Costs, UAH / ha	10745.0	8596.0	6447.0	5733.06	4298.0	2986.42
Production Net Costs, UAH / ha	5733.06	5733.06	5733.06	5733.06	5733.06	5733.06
Profit (Loss), UAH / ha	5011.94	2862.94	713.94	0.0	- 1435.06	- 2746.64
Profitability (Unprofitability) level, %	87.4	49.9	12.5	0.0	- 25.0	- 47.9
Total energy stored in the crop, MJ / ha	127871.1	102296.9	76722.7	68226.4	51148.5	35540.0
Energy costs, MJ / ha	35540.0	35540.0	35540.0	35540.0	35540.0	35540.0
Energy Efficiency Ratio (K_{ee})[1)]	3.598	2.878	2.159	1.920	1.439	1.000

[1)] $K_{ee} < 1$ – the production is ineffective; 1 – 2 – the low level; 2 – 3 – the average level; 3 – 3.5 – above the average level; $K_{ee} > 3.5$ – the high level of energy efficiency

Source: Calculated by the author

The author found that costs are 5733.06 UAH for 1 ha of sugar beets, energy costs are 35540 MJ / ha, sugar beets costs are 10745 UAH / ha, the total energy stored in the crop − 127871.1 MJ / ha. The level of profitability of sugar beet production is 87.4% and the energy efficiency ratio is 3.598 (high energy efficiency).

Conclusions. The mainstream of production policy regarding technical provisions of sugar beets industry should be the productivity improving, energy efficiency increasing of agricultural machinery, and share of energy and material intensity reduction by 20 − 50%.

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Анотація. *Досліджуються економічні та енергетичні витрати на виробництво цукрових буряків із використанням системи машин закордонного виробництва. Здійснено розрахунок беззбиткового рівня виробництва цукрових буряків (за різного рівня урожайності) з урахуванням економічних та енергетичних показників ефективності виробництва для сільськогосподарських підприємств зони Лісостепу.*

Ключові слова: *цукрові буряки, системи машин, економічна ефективність, енергетична ефективність.*

Аннотация. *Исследуются экономические и энергетические затраты на производство сахарной свеклы с использованием системы машин заграничного производства. Рассчитан уровень безубыточного производства сахарной свеклы (при разном уровне урожайности) с учетом экономических и энергетических показателей эффективности производства для сельскохозяйственных предприятий зоны Лесостепи.*

Ключевые слова: *сахарная свекла, системы машин, экономическая эффективность, энергетическая эффективность.*

Annotation. *Economic and power charges are investigated on the production of sugar beets with the using the machines system of foreign production. The calculation of break-even level of sugar beets production (at the different level of the productivity) is carried out taking into account the economic and power indicators of production efficiency for the agricultural enterprises of Forest-Steppe zone.*

Keywords: *sugar beets, system of machines, economic efficiency, power efficiency.*

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THE EVALUATION OF ECONOMIC EFFICIENCY OF PRODUCING AND SELLING SUNFLOWER SEEDS AT AGRICULTURAL ENTERPRISES

Annotation. *Increasing demand for oilseeds in the world agricultural markets and in the agricultural market of Ukraine has been observing in resent years. Especially popular are sunflower seeds and derived products. That situation came under heightened scrutiny. This research examines the economic efficiency of production and selling sunflower seeds at agricultural enterprises of Ukraine. It is based on the Ukrainian summary statistical reports (2006–2011) and analyzes the main economic indicators of sunflower seeds production. The factors*