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# Sunflower is the main oil crop in Ukraine

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**Abstract:** The article is devoted to the analysis of production volumes and efficiency of sunflower cultivation in Ukraine. It is shown that sunflower occupies more than 70% of the total acreage under oil crops. Attention is focused on the fact that the dominance of sunflowers in the structure of the production of oil crops provides this crop with a special role in the agricultural market of Ukraine. The dynamics of sown areas, gross harvests and the level of productivity of sunflowers in Ukraine for the period 2018–2020 were analyzed. The effectiveness of sunflower production was studied in terms of forms of management of agrarian formations and by the amount of land in use. It has been established that the most effective cultivation of sunflowers is carried out by agricultural enterprises with a land area of more than 2 thousand hectares. Cost calculations and their structure for growing 1 ha of marketable sunflower in 2021 are presented. The volumes and structure of the directions of consumption of marketable sunflower seeds in Ukraine are shown. Practical recommendations for improving the process of sunflower production are proposed, taking into account the balance of supply and demand for marketable products.

**Keywords:** oil; processing; production; production costs; sunflower; supply and demand balance.

## Introduction

The purpose of the article is to analyze the dynamics, volumes and structure of sunflower production and consumption in Ukraine.

Research methods: empirical research – observation, comparison and measurement for 2018–2020; methods used at the theoretical level – analysis, synthesis; research methods used to evaluate research results, data collection and relevant to the topic; economic and statistical – to assess the dynamics

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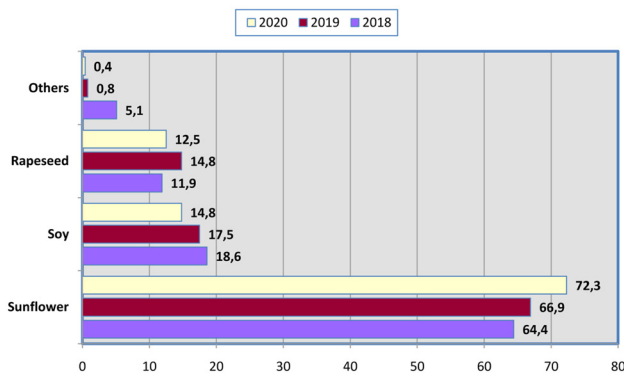
and development of sunflower production in Ukraine; graphic – to determine structural changes in the production of oil crops.

Research results. Practical provisions and methodical approaches regarding the aspects of cultivation and efficiency of sunflower production in Ukraine are summarized. It was established that during 2018–2020, the area of sunflower crops increased by 7.9%, in the total structure of oilseed crops, they occupy more than 72%. It was determined that according to the yield indicator, the production of this crop is more efficient in agricultural enterprises. The popularity of sunflowers in agricultural enterprises is due to the guaranteed sale of finished products.

Elements of scientific novelty. The justification that the development of the market of oil crops in Ukraine is based on the dominance of sunflowers has received further development. Practical recommendations for improving the process of sunflower production, taking into account the balance of demand and supply of commodity products in the agricultural market of Ukraine, are proposed.

Statement of the problem. In the market of oilseeds in Ukraine for the last three years, the leading trend has been formed – sunflower occupies a leading position, rapeseed cultivation is restrained, and soybean production is reduced. Analysis of the structure of oilseeds in Ukraine during this period showed that the share of sunflower crops in the total area under all oilseeds increased from 64.4% in 2018 to 72.3% in 2020, the share of rapeseed increased slightly from 11.9% in 2018 to 12.5% in 2020, the share of soybeans decreased from 18.6% in 2018 to 14.8% in 2020 (Figure 1).

Oilseed production in Ukraine exceeded 22 million tons in an area of 9 million hectares. Every year about 18 million tons of oilseeds are used for oil production,



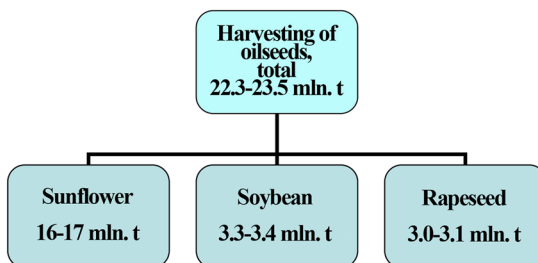
**Figure 1:** Structure of oilseeds in Ukraine (in %, 2018–2020)<sup>a</sup> (<sup>a</sup>calculated according to the State Statistics Service of Ukraine).

and 4 million tons of oilseeds are exported. In the world market of oilseeds, Ukraine ranks first in the world in the production of sunflower (13 million tons) and exports of sunflower oil (6 million tons). The second position in the world on exports of rapeseed – 2.4 million tons and sunflower meal – 4.4 million tons, in the sixth position on exports of soybeans – 2.2 million tons, in the eleventh position on exports of soybean oil – 2014 thousand and rapeseed oil – 144 thousand tons.

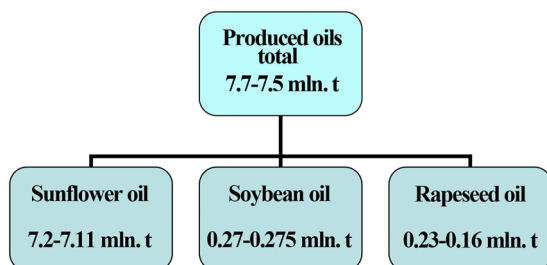
According to the preliminary estimate of the Ukroliyprom Association, in 2021/22 MY the production of the main types of oilseeds will reach 22.3 million tons against 18.46 million tons in 2020/21 MY (growth – 121%). In particular, the production of sunflower seeds is projected at 16.0 million tons (growth – 122%), rapeseed – 3.0 million tons (growth – 107%), and soybeans – 3.3 million tons (growth – 129%) (Figure 2).<sup>a</sup>

Growing oilseeds is a profitable area of agricultural production. In terms of economic efficiency, oilseeds outperform other crops. The highest rates of profitability of oilseeds in Ukraine were recorded in 2015 – sunflower 80%, rapeseed 44%, soybeans 38%. At the same time, in 2020 the average level of profitability of oilseeds production fell sharply to 39% for sunflower, 10% for rapeseed, and 13% for soybeans, due to changes in the price situation in the agricultural market and rising costs for production.

The main sales area of oilseeds is oil processing and export of soybean and rapeseed. In the association “Ukroliyprom” the decline in production is explained, first of all, by the restraint of sales of sunflower seeds by agricultural producers in anticipation of an increase in prices for this raw material. This is confirmed by two factors: a significant increase in stocks of sunflower producers and; a decrease in the export of sunflower oil during this period by 14.2%. According to forecast calculations, during 2021–2022, the amount of oil produced will be reduced from 7.7 to 7.5 million tons by reducing the volume of sunflower oil – from 7.2 to 7.11 million tons, rapeseed oil – from 0.23 to 0.16 million tons volumes of oil production in Ukraine, 2021–2022 (Figure 3)<sup>a</sup>.



**Figure 2:** Forecast of the harvest of major oilseeds for 2021–2022. (<sup>a</sup>Forecast of Ukroliyprom Association).



**Figure 3:** Forecast of the amount of oil produced during 2021–2022. (<sup>a</sup>Forecast of Ukroliyprom Association).

**Table 1:** Sown areas and gross harvest of sunflower (2018–2020)<sup>a</sup>.

Years	Sowing area, thousand hectares	Gross collection, thousand tons	Yield, c/ha
2018	5923	12,193	24.1
2019	5760	13,088	27.0
2020	6381	13,136	20.6
Changes, %	107.7	107.7	85.0

<sup>a</sup>According to the State Statistics Service of Ukraine.

Ukraine ranks first in the world in sunflower production, according to the results of 2020, 13.1 million tons of sunflowers in Ukraine were harvested from an area of 6.3 million hectares against 12.1 million tons from 5.9 million hectares in 2018. In general, over the last 3 years, the area under sunflower has increased by 7.7%, and gross harvests vary depending on the level of yield (Table 1).

In Ukraine, sunflower is grown by 21,856 agricultural enterprises. Most of them, 12,692 (58.1%), have up to 100 ha. Analysis of sunflower production in terms of agricultural enterprises by land area showed that the highest productivity (up to 24.7 c/ha) is recorded in 318 enterprises with a land area of 2000–3000 ha. Sunflower yield in 24,538 agricultural formations with a land area of up to 2000 ha ranges from 16.4 c/ha to 22.1 c/ha. The lowest productivity of sunflowers in agricultural formations with a land area of up to 100 ha is 16.4 c/ha (Table 2).

Sunflower production in Ukraine is carried out by households and agricultural enterprises. The analysis showed that 87% of sunflower is grown by agricultural enterprises and 13% by households. It should be noted that the yield of sunflowers in agricultural enterprises was 23.4 c/ha in 2018, and 20.6 c/ha in 2020. The yield of sunflowers in households was 18.2 c/ha in 2018, and it fell to 15.0 c/ha in 2020 (Table 3).

The efficient production of oilseeds is determined by several factors. The main ones are technological factors: arable land, soil fertility, seed production, crop

**Table 2:** Grouping of enterprises by the size of the harvested area of sunflower, 2020<sup>a</sup>.

Enterprises structure according to the cultivated area (in hectares)	Units		Amount production after the completion		Crop capacity c/ha
	Structure	%	000 t	%	
Up to 100.00	21,856	100.0	11,492.9	100.0	21.4
100.01–200.00	12,692	58.1	771.2	6.7	16.4
200.01–500.00	2894	13.2	829.3	7.2	19.6
500.01–1000.00	3424	15.7	2267.4	19.8	20.7
1000.01–2000.00	1704	7.8	2496.8	21.7	20.8
2000.01–3000.00	824	3.8	2458.9	21.4	22.1
More than 3000.00	181	0.8	1070.9	9.3	24.7
	137	0.6	1598.4	13.9	24.6

<sup>a</sup>According to the State Statistics Service of Ukraine.**Table 3:** The structure of sunflower production in terms of forms of management, 2018–2020<sup>a</sup>.

Years	Farms of all forms		Enterprises		Households	
	Volume 000 of quintals	Productivity c/ha	Volume 000 of quintals	Productivity c/ha	Volume 000 of quintals	Productivity c/ha
2018	138,827	100.0	118,796	85.6	20,031	14.4
2019	149,234	100.0	127,207	85.3	22,027	14.7
2020	131,358	100.0	115,008	87.5	16,349	12.7

<sup>a</sup>The State Statistics Service of Ukraine.

farming and plant care system, as well as economic factors: product price, market demand, production costs, volume and sources of financial resources. For example, in irrigated lands, the yield of sunflower is higher by 6 c/ha, which confirms the effectiveness of reclamation measures to organize the production of oilseeds.

Calculations have shown that is for to grow 1 ha of commercial sunflower seeds it is necessary to spend up to 11.4 thousand UAH<sup>1</sup> based on hybrid seeds selected by the Institute of Oilseeds NAAS “Pervistok”, which is twice cheaper as foreign counterparts, as well as the average rent for land at the level of 2.5 thousand UAH. at the expected yield at the level of 2.5 t/ha (Table 4). In the structure of costs 55.5% or 6.3 thousand UAH/hectare are material costs, 4% are labour costs, and other direct costs and overhead costs are 40.5% or 4.6 thousand UAH/ha.

Analysis of the balance of demand and consumption of sunflowers in Ukraine for 2018–2020 showed an increase in initial stocks by 4.5 times, increasing imports by 20%, and reducing processing by 10.5%. Sunflower exports increased by 50% (Table 5).

The stability and balance of sales directions of commodity products explain the popularity of sunflowers among farmers in Ukraine in the last 10 years. Forming the production program of farms based on sunflower crops, product manufacturers hope for a guaranteed sale of finished products at a high price. Increased demand for commercial sunflower is reflected in practice in a two-field crop rotation (wheat + sunflower), and other crops are mostly not included in the crop rotation. The expansion of sunflower crops has led to the fact that in many farms its share in the structure of cultivated areas exceeds 30% instead of the recommended 10%, and the return of this crop to the previous place of cultivation is carried out after one year instead of the recommended three years. Therefore, the observed increased load on sunflower crop rotation is a debatable issue of the development of the agricultural sector of the economy of Ukraine.

Taking into account the above, according to the results of the research on the aspect of balancing the supply and demand of sunflower production in the domestic market of Ukraine, the following is recommended:

- to stabilize the area of sunflower production at the level of 6 million hectares;
- to ensure the growth of the gross harvest of sunflowers due to the disclosure of the yield potential of plants;
- to increase the share of commercial seed processing into oil in the domestic market of Ukraine;
- to introduce sunflower hybrids of Ukrainian origin into the production cycle.

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<sup>1</sup> Ukrainian hryvnia, national currency of Ukraine.

**Table 4:** The cost of growing commercial sunflower seeds (2021)<sup>a</sup>.

Cost items	Costs, UAH/ha	Structure, %
<b>Direct material costs – total</b>	<b>6309.5</b>	<b>55.5</b>
Seeds (domestic selection)	500	7.9
Plants protecting tools	960	15.2
Diesel	2025	32.1
Lubricants	24.5	0.4
Fertilizers	2800	44.4
<b>Direct labour costs</b>	<b>455</b>	<b>4.0</b>
<b>Other direct costs and overhead costs – total</b>	<b>4612.1</b>	<b>40.5</b>
Taxes on the wage fund	100.1	2.2
Amortization	250	5.4
Land rent	2500	54.2
Repair costs	300	6.5
Third-party services	600	13.0
Administrative expenses	862	18.7
<b>Total:</b>	<b>11,376.6</b>	<b>100</b>

<sup>a</sup>Author's calculations.

**Table 5:** Dynamics of the balance of demand and consumption of sunflower in thousand tons (2018–2020)<sup>a</sup>.

Indexes	2018	2019	2020	Changes, %
Initial stocks	178	328	810	455
Production	14,950	14,625	13,136	87.8
Imports	5	5	6	120.0
Proposal	15,133	14,958	13,952	92.2
Consumption	14,600	12,552	13,456	92.1
Export	100	100	150	150
Demand	14,700	12,652	13,150	89.5
Leftovers	328	1153	156	47.5

<sup>a</sup>According to the State Statistics Service.

## Conclusions

Ukraine ranks first in the world in the production of sunflower (13 million tons) and exports of sunflower oil (6 million tons). Research has established that during the period 2018–2020, the area planted under sunflowers grew by 7.9% in the overall structure of oilseed crops in Ukraine and exceeded 72%. The average level of crop productivity in the country is 24 c/ha. More than 21,000 agricultural enterprises grow sunflowers in Ukraine, 58.1% of them have up to 100 ha in use.

The highest sunflower productivity at the level of 24.7 c/ha was achieved in agricultural enterprises with a land area of 2–3 thousand hectares, and the lowest sunflower yield – 14.6 c/ha was recorded in agrarian formations with a land area of up to 100 ha.

Households (13%) and agricultural enterprises (87%) grow sunflowers in Ukraine. It was established that according to the indicator of crop yield, the more efficient production of this crop is carried out in agricultural enterprises. The difference in productivity between agricultural enterprises and households reaches up to 10 quintals from 1 ha. Calculations showed that the cultivation of 1 ha of commercial sunflower seeds based on sunflower hybrids selected by the Institute of Oil Crops of the National Academy of Sciences of Ukraine is twice as cheap as based on foreign analogues. Analysis of the balance of demand and consumption of sunflowers in Ukraine for 2018–2020 showed a 4.5-fold increase in initial stocks, 50% in exports, 20% in imports, and a 10.5% reduction in processing. Stable sales directions of commercial products explain the popularity of sunflowers among farmers in Ukraine.

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