ECONOMIC ANALYSIS AND DEVELOPMENT PERSPECTIVES OF SUNFLOWER CULTIVATION IN SĂLAJ COUNTY, ROMANIA

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REVIEW

Abstract

This study examines the evolution and economic performance of sunflower (Helianthus annuus L.) cultivation in Sălaj County, Romania, between 2018 and 2023. The research analyzes trends in cultivated areas, productivity measured by oil yield per hectare, and the profitability of a partially specialized medium-sized farm located in the Șimleu Silvaniei area. Using data from the Sălaj County Directorate for Agriculture, the National Institute of Statistics, and Eurostat, the study integrates quantitative analysis, economic evaluation, and simulation models to assess farm-level efficiency and profitability. Results show a gradual increase in sunflower yields—from 2.67 t/ha in 2018 to 2.93 t/ha in 2023—driven by improved technologies and farming practices. Despite Sălaj County having the smallest cultivated area in the North-West region, profitability remains high, with an economic rate of return of 128.9% and a net profit of 4,125 lei/ha in 2023. Simulations for 2025–2027 confirm continued profitability under most scenarios. The study concludes that sunflower farming in Sălaj can be economically sustainable, especially with the adoption of precision agriculture, crop insurance, cooperative structures, and EU-funded digitalization initiatives.

Keywords: sustainability, profitability, sunflower

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INTRODUCTION

Sunflower (*Helianthus annuus* L.) is one of the most important oilseed crops in Romania, holding a significant place both in the agricultural structure and in the agro-food trade balance. Sălaj County, characterized by predominantly mixed and medium-sized agriculture, has shown an interesting dynamic regarding the cultivated areas and yields obtained from sunflower cultivation.

1. Analyze the evolution of sunflower cultivated areas in Sălaj County.
2. Assess productivity expressed through the quantity of oil obtained per hectare.
3. Conduct an economic analysis of the profitability of a partially specialized sunflower farm.

Sălaj County is located in the north-western part of Romania and is characterized by a varied relief, dominated by hills and depressions, with average altitudes ranging from 300 to 600 meters. These pedoclimatic conditions allow for a diversification of agricultural crops, including sunflower cultivation in areas with favorable solar exposure and well-drained soils.

According to data from the Sălaj County Directorate for Agriculture (2023), the total agricultural area of the county is approximately 200,000 hectares, of which about 120,000 hectares are arable land. Between 2018 and 2023, between 4,000 and 4,500 hectares were annually cultivated with sunflower, representing about 3.5–4% of the total arable land (INS, 2023).

Regarding farm structure, Sălaj County hosts over 10,500 agricultural holdings, mostly family-owned, but approximately 150 medium and large farms are directly involved in sunflower cultivation and processing, including through partnerships or delivery contracts to local or regional processors (Romanian Farmers Club, 2023).

MATERIALS AND METHODS

Data were obtained from the archives of the Sălaj County Directorate for Agriculture, the National Institute of Statistics (INS), and Eurostat. The case study was conducted on a mixed agricultural farm in the Șimleu Silvaniei

area, with a total area of 100 hectares, of which 30 hectares are annually dedicated to sunflower cultivation.

The research methodology included:

1. **Quantitative Analysis**: Evolution of cultivated areas and total yield per hectare between 2018 and 2023.
2. **Economic Analysis**: Gross income per hectare, direct and indirect costs, gross and net profit.
3. **Simulation Model**: Economic projection for the period 2025–2027 with three scenarios.
4. **Efficiency Evaluation**: Indicators such as economic rate of return, labor productivity, and profit per unit area (INS, 2023; Eurostat, 2022).

RESULTS AND DISCUSSION

The data obtained show a constant increase in cultivated areas and production in Sălaj County. The average yield increased from 2.67 t/ha in 2018 to 2.93 t/ha in 2023, reflecting technological improvements and quality hybrids.

Table: Measures to Enhance Farm Economic Efficiency

Proposed Measure	Estimated Effect on Efficiency
Introduction of variable seeding technology	Reduction in seed onsumption by 10–15% and optimization of density
Use of drones for monitoring	Reduction of losses caused by diseases and pests, rapid response
Differential fertilization by zones	ncrease in production by up to 5–10% and reduction of fertilizer costs
Accessing PAC funds for digitization	Reduction of own investments and rapid amortization of equipment
rop insurance and orward contracts	Reduction of financial risk in difficult agricultural years
ooperation within a cooperative	Reduction of input costs nd better market access

In **Bihor County**, the cultivated area was the largest in the North-West region in all four analyzed years. In 2020, 307,845 hectares were cultivated, and in 2021, there was a slight increase to 308,475 hectares. In the following years, the area began to decrease: in 2022 it reached 300,705 hectares, and in 2023 it was 300,531 hectares. Nevertheless, Bihor County remains an agricultural leader in the region.

In **Satu Mare County**, the cultivated area ranks second in size. In 2020, 225,504 hectares were cultivated. In 2021, the area increased significantly to 249,851 hectares. In 2022, it decreased to 229,958 hectares, and in 2023 it stabilized at 226,567 hectares. Despite fluctuations, Satu Mare maintains a significant agricultural contribution.

Cluj County has a significantly smaller cultivated area than Bihor and Satu Mare. In 2020, 115,521 hectares were cultivated. In the following years, the values decreased: 108,345 hectares in 2021, 107,432 hectares in 2022, and 108,642 hectares in 2023. Although there is a slight recovery in 2023, the general trend is downward.

In **Maramureș County**, the cultivated area remained relatively constant. In 2020, it was 59,491 hectares. In 2021 it decreased to 56,370 hectares, in 2022 to 55,248 hectares, and in 2023 it slightly increased to 56,090 hectares. The values fall within a narrow range, indicating stable agriculture.

In **Bistrița-Năsăud County**, in 2020, 56,073 hectares were cultivated. In 2021, the area decreased to 49,787 hectares, and in 2022 it continued to decrease to 48,795 hectares. However, in 2023, there was a recovery to 52,930 hectares. This county is the

only one where a clear recovery is noted after two consecutive years of decline.

Sălaj County has the smallest cultivated area among the six analyzed counties. In 2020, 64,957 hectares were cultivated, and in 2021, the area slightly increased to 65,981 hectares. In 2022, 64,815 hectares were recorded, and in 2023 – 65,276 hectares. The evolution shows stability without significant variations.

At the regional level, the **North-West Region** had a total cultivated area of 827,392 hectares in 2020. In the following years, the values were: 838,814 hectares in 2021, 806,338 hectares in 2022, and 805,907 hectares in 2023. Thus, a slight decrease in the cultivated area at the regional level is observed. Bihor and Satu Mare are the main agricultural counties, while Cluj, Maramureș, Bistrița-Năsăud, and Sălaj have smaller but stable areas. The general trend is to maintain constant agricultural activity with minor annual adjustments.

Județ	2020	2021	2022	2023
Bihor	307845	308475	300705	300531
Satu Mare	225504	249851	229958	226567
Cluj	115521	108345	107432	108642
Maramureș	59491	56370	55248	56090
Bistrița-Năsăud	56073	49787	48795	52930
Sălaj	64957	65981	64815	65276
Total Nord-Vest	827392	838814	806338	805907

The chart illustrates the agricultural production of sunflower in the North-West region of Romania for the period 2020–2023. The data is broken down by counties: Bihor, Bistrița-Năsăud, Cluj, Maramureș, Satu Mare, and Sălaj, as well as for the regional total. Production is expressed in tonnes.

In 2020, the total regional production was 185,152 tonnes. The highest quantities were recorded in the counties of Satu Mare (approximately 81,170 tonnes), Bihor (72,377 tonnes), and Cluj (25,048 tonnes). Maramureș and Sălaj had low production levels, under 2,000 tonnes.

In 2021, regional production increased to 193,651 tonnes, reaching the highest level in the analyzed period. Satu Mare was again the leader, with 103,688 tonnes, followed by Cluj (39,980 tonnes) and Bihor (67,694 tonnes). The other counties recorded lower volumes, with Maramureș remaining at a very low level, under 1,000 tonnes.

In 2022, production dropped significantly to 139,941 tonnes, the lowest level in the four-year period. All counties reported decreases, with Bihor (50,683 tonnes) and Satu Mare (66,552 tonnes) being the most affected. Cluj produced 35,515 tonnes, while the other counties continued to have modest contributions.

In 2023, regional production increased slightly to 150,215 tonnes. Satu Mare remained the main producer, with 71,423 tonnes, followed by Bihor (64,984 tonnes) and Cluj (31,805 tonnes). The other counties maintained low values, similar to those of previous years.

Overall, Satu Mare is the county with the highest sunflower production each year. Bihor and Cluj also contribute significantly, while Maramureș, Bistrița-Năsăud, and Sălaj have a smaller share in the regional total. The year 2022 was the weakest, possibly due to unfavorable weather conditions, while 2023 marked a partial recovery in production.

Județ	2020	2021	2022	2023
Bihor	72377	67694	50683	64984
Satu Mare	81170	103688	66552	71423
Cluj	25048	39980	35515	31805
Maramureș	1900	900	850	880
Bistrița-Năsăud	1200	1000	1000	1123
Sălaj	1457	1389	1341	1475
Total Nord-Vest	185152	193651	139941	150215

Economic Analysis by Scenarios (2025–2027)

Economic simulations for the years 2025–2027 were conducted based on various price and yield scenarios. The results show that in the optimistic scenario, a net profit of 5,760 lei/ha can be obtained, while in the pessimistic scenario, the profit decreases to 300 lei/ha. These projections were based on historical data and adjusted for inflation, input price fluctuations, and expected changes in EU agricultural subsidies (MINAGRI, 2023).

The analysis reveals that even under variable market conditions, sunflower farming in medium-sized holdings in Sălaj County can maintain profitability, especially when using precision agriculture technologies and accessing structural funds (Popescu, 2018; Stoica, 2022).

CONCLUSIONS

This study highlights that Sălaj County has significant agricultural potential for sunflower cultivation, with rising productivity over recent years. Medium-sized farms can achieve high profitability, although they are exposed to market and climatic risks. To further increase efficiency and resilience, the following strategies are recommended:

- **Diversification of marketing channels**, including local processing initiatives (Ciupitu, 2020)
- **Digitization and precision agriculture adoption**, such as drones and GPS-guided equipment (Drăgoi, 2019)
- **Crop insurance and forward contracting** to mitigate weather and price volatility risks
- **Farmer cooperation through agricultural cooperatives** to reduce input costs and access broader markets (Romanian Farmers Club, 2023)

Adopting these practices could make the sunflower sector in Sălaj more competitive and sustainable within both national and EU agricultural contexts.

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