

DYNAMICS AND STABILITY OF INPUT-OUTPUT RELATIONS IN
SUNFLOWER PRODUCTION

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Abstract

The investigation included 250 sunflower growers from the Vojvodina Province in the period from 1979 to 1988.

The dynamics and stability of individual inputs in sunflower production were estimated through equivalent amounts of produce (sunflower grain) needed to cover the inputs under consideration.

Based on the analytical-comparative method, using rates of change and variation coefficients, the following conclusions were drawn:

- the cost of inputs grew faster than the price of sunflower grain;
- the equivalent amounts of sunflower grain necessary to cover material expenses, amortization, and salaries grew at the rate of 2.68%, 6.81%, and 1.12%, respectively, while the amount necessary to cover the expenses for machinery decreased at the rate of -1.79%;
- the growth and large variability of prices of the inputs caused reductions of sunflower acreage and yield.

Introduction

It is known that in any production there exists a discrepancy between the rate of growth of its physical volume and economic indicators which define its performance. In the case of sunflower production, the difference is generated by input-output relations which confer a major influence on its economic results. Since, however, various tendencies of sunflower production bear effect on the input-output relations within it, the inputs differ from one year to another in their effect on the results of sunflower production.

With this in mind, an attempt was made to analyze the dynamics and stability of the input-output relations in order to identify the factors which have brought about the unfavorable trends in the sunflower production in the Vojvodina Province.

When the negative factors are identified, it will be possible to counteract them in order to establish more stable and favorable input-output relations in the sunflower production.

Source of Data and Method

In the realization of the envisaged research target, records were used which the statistics services of sunflower growers supply annually to the Department of Statistics of the Vojvodina Province. The investigation included 250 sunflower growers in the period of ten years (1979 - 1988).

The dynamics and stability of inputs (production cost) was estimated through the equivalent amounts of produce (sunflower grain) needed to cover individual elements of the production cost. The equivalent amounts were calculated each year, by dividing the value of each element that comprises the production cost by the commercial price of sunflower grain in the same year. The outputs (production results) were analyzed on the basis of indicators for yield and profit per unit area.

The stability of inputs and outputs was assessed by variation coefficient, their dynamics by the rate of change.

The analytical-comparative method was applied in the investigation. The results are presented in the table.

Results and Discussion

On the territory of the Vojvodina Province, sunflower is counted among staple crops, especially in the public sector, because its average annual acreage exceeds 10% of the total arable land in the province. In the period under consideration, however, a slowdown and a drop in the sunflower production have been registered.

The production results achieved by the sunflower growers included in the analysis were not satisfactory. The harvested acreage did not expand, as indicated by the low rate of growth of 0.24%. In addition to that, the examined

period was characterized by considerable annual variations in the harvested acreage ($V = 23.98\%$). The receding and unstable acreage was the result of yield reduction, which went down at the average annual rate of -1.12% , accompanied with large annual variations in yield level ($V = 15.67\%$).

In contrast to the yield reduction and the receding acreage, the total income and the profit per unit area had an ascending trend. The rate of profit per hectare was higher than that for the total income, 86.38% and 71.91% , respectively. This trend was due to a high inflation during the period analyzed, as confirmed by the increase and variation in the commercial price of sunflower grain, 64.57% and $V = 164.88\%$, respectively. If the value indicators for the results of sunflower production are assessed on the basis of fixed prices, the trend will be opposite.

The production costs and the value indicators for the results of sunflower production do not reflect the actual state of the production because the period analyzed was characterized by a high inflation and a disbalance between the prices of inputs and outputs. In such cases, a position of a production may be estimated on the basis of the amount of produce needed to cover certain elements of production cost.

It was found that the equivalent amounts of produce necessary to cover the cost of individual inputs varied considerably while their trend depended on the production cost they were compared with (Table 1).

The equivalent amounts of produce needed to cover the costs of seed, mineral fertilizers, manure, and the use of tractor and combine harvester had a descending trend. The decreasing amount of produce that covered the above costs may have been brought by a slower increase of prices of the inputs in relation to the price of the yield realized, but it also may have been a consequence of reduced expenditures in the production. During the period under observation, the reduction of expenditures in the production was an important factor which affected directly the yield level which, in its turn, had a descending trend too.

Contrarily to the inputs mentioned above, increased amounts of produce were needed to cover the costs of crop protection, drying, and salaries. It appears that the increase in these expenses resulted from a faster growth of prices of these inputs in relation to the price of the yield realized. In some years, however, the production conditions intensified the attacks by weeds, diseases and pests, which called for a larger application of chemicals and the use of aircrafts.

Tab. 1 - The indicators of the dynamics and stability of the equivalent amounts of sunflower grain needed to cover the cost of individual inputs

Expenditure	Average value (dt/ha)	Var. coeff. (%)	Parameters of exponential trend		Rate of change (%)
			a	b	
Seed	0.277	47.23	0.266	0.9841	-1.59
Min. fertilizers	1.153	49.52	1.288	0.9615	-3.93
Manure	0.043	63.07	0.049	0.9467	-5.34
Chemicals	1.060	50.18	0.415	1.1482	14.82
TOTAL MATERIAL EXPENSES	2.822	28.63	2.313	1.027	2.68
Tractor	0.824	31.08	0.871	0.9814	-1.86
Harvester	0.077	73.53	0.014	1.2813	28.13
Aircraft	0.018	62.86	0.007	1.1297	12.97
Drying	2.969	29.41	3.139	0.9821	-1.79
TOTAL FOR MACHINERY	0.272	44.52	0.176	1.0681	6.81
Amortization	4.126	25.46	3.727	1.0112	1.12
Salaries					

Regarding the equivalent amounts considered, the fastest rate of increase was found for the amount of grain necessary to meet the expenses for aircraft use (28.13%). In this case, however, the absolute value was very small and prone to considerable variation. Besides the use of aircraft, a significant rate of increase was registered for the cost of chemicals (14.82%) the increase of which was so intensive that the rate of increase for the total material expenses went up to 2.68% despite the negative rates for the other elements. It is of interest to note that the fastest rate of decrease was found for the equivalent amounts needed to cover the expenses for mineral fertilizers (-3.93%). The rate of decrease for manuring, which was larger than that for mineral fertilizers, should be disregarded because manuring was practised on a limited acreage.

The absolute values of the equivalent amounts show that the largest amount of produce was necessary to cover salaries - 412.6 kg of sunflower grain. Conversely, the amount for the amortization per unit area was 27.2 kg.

Conclusion

On the basis of the characteristics of the sunflower production discussed previously, the following conclusions may be drawn:

- the cost of inputs grew faster than the commercial price of sunflower grain;
- the equivalent amounts of sunflower grain needed to cover material expenses, amortization, and salaries grew at the rate of 2.68%, 6.81%, and 1.12%, respectively, while the amount necessary to cover the expenses for machinery decreased at the rate of -1.79%;
- the growth and large variability of prices of the inputs caused reductions of sunflower acreage and yield;
- to stabilize the relations which govern the sunflower production, it is necessary to enforce a long-term price policy for both inputs and outputs.

References

- Andrić J, Živković D: Mogućnosti i problemi efikasne proizvodnje suncokreta. Glasnik poljoprivredne proizvodnje, prerade i plasmana, 7-8, Beograd, 1983.
- Bogavac M, Živković D: Organizacija i ekonomika proizvodnje suncokreta. Ekonomika poljoprivrede, 4, Beograd, 1987.
- Bogavac M: Stanje i osnovni pravci razvoja proizvodnje suncokreta u Vojvodini. Ekonomika poljoprivrede, 7-8, Beograd, 1987.
- Marko J et al.: Ekonomski položaj osnovnih ratarskih useva. Institut za ekonomiku poljoprivrede i sociologiju sela, Novi Sad, 1980.