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RESULTS AND POSSIBILITIES OF ECONOMICALLY EFFECTIVE PRODUCTION
 OF SUNFLOWER IN YUGOSLAVIA

1. Sunflower Production in the World

With an area of 13 - 14 million hectares sunflower holds an important place in the world production of raw material for obtaining plant oil and grease. By its production (about 19 million tons in 1985) sunflower is second in that group of crops after soya bean production. It is important to emphasize that sunflower represents the most qualitative raw material, i.e., enables the production of the best quality edible oil and other products. The regional production of sunflower in the world, its part in the production of raw material for obtaining plant oil and the level of production intensity achieved are shown in the following table.

Tab. 1. Planted Area and Achieved Average Yield in the Production of basic Raw Material for Obtaining Edible Oil in 1985

Area	Soya bean		Rapeseed		Sunflower	
	ooo ha	t/ha	ooo ha	t/ha	ooo ha	t/ha
World, total	52,368	1.93	14,968	1.26	14,589	1.31
U.S.A.	24,992	2.29	-	-	1,151	1.24
Asia	10,675	1.31	8,487	0.95	2,668	1.19
Argentina	3,269	1.99	2	1.00	2,350	1.46
U.S.S.R.	766	0.72	123	0.61	4,085	1.28
EUROPE (without U.S.S.R.)	600	1.55	2,391	2.58	3,207	1.53
Spain	5	1.80	22	0.68	1,125	0.81
France	28	2.07	468	2.99	635	2.38
Rumania	285	0.98	40	1.25	480	1.50
Hungary	24	1.60	56	1.52	343	1.96
Bulgaria	64	1.33	-	-	260	1.65
Yugoslavia	101	1.72	63	2.00	112	2.09

Source: FAO Production Yearbook, Vol. 39, 1985

The proportionally fast increase of soya bean production in the world limited the increase of sunflower production, which in a longer time period varied from 100 to 150.000 hectares per year, with a continually decreasing tendency. According to the available statistical data in the period after 1980 there was, however, a significant increase in the volume of oil plants production, particularly in the production of rapeseed and sunflower. It may be seen from the data in the following table that an outstanding increase in the volume of raw material production for obtaining plant oil occurred in the mentioned period in the agriculture of European countries.

Tab. 2. Increase in the Volume of Production of Oil Plants in the World in the Period 1981 - 1985

	Area increase			Increase in volume of production		
	Total %	Annual average		Total %	Annual average	
		ooo ha	%		ooo ha	%
<u>Sunflower</u>						
World, total	20.31	616	5.08	33.93	713	8.48
Europe ^{x)}	41.27	234	10.32	58.54	453	14.63
<u>Rapeseed</u>						
World, total	27.80	814	6.95	56.76	1,710	14.19
Europe ^{x)}	36.78	161	9.20	71.74	644	17.93
<u>Soya bean</u>						
World, total	3.59	454	0.90	13.96	3,089	3.49
Europe ^{x)}	22.95	28	5.73	73.97	99	18.49

x) Without U.S.S.R.

Source: FAO Production Yearbook, Vol. 39, 1985

In addition to the increase in sown area, the increase of yield per area unit had a significant increase in the volume of production of oil plants as a result of scientific-technical progress in this field of production. Thus, in the period of consideration the average annual yield increase in the world in the production of rapeseed was 5.96%, sunflower 2.93% and soya bean 2.71%.

2. Sunflower Production in Yugoslavia

In view of the favourable natural conditions for an effective production of oil seeds it is possible to cultivate them in several areas in Yugoslavia. According to the planted area the part of Yugoslavia in the world production of oil plants is approximately 0.34%, or in the European production (without U.S.S.R.) 4.45%. On the planted area of 112,000 hectares in Yugoslavia in 1985 0.75% of the world production, or 3.49% of the European production of sunflower seed, was obtained. By the volume of production of 233,000 tons of sunflower seed obtained the part of Yugoslavia in the period under consideration, in the world production of this most qualitative raw material for obtaining edible oil was 1.22% and in the European production without U.S.S.R. 4.75%. In Yugoslavia sunflower production has a fairly long tradition. The planted area of approximately 10,000 hectares in 1930 was almost doubled in the period up to the beginning of the Second World War. During the first two decades of the after-war period

the production of sunflower stagnated mainly on the area of approximately 100,000 hectares with low yields obtained, most frequently less than one ton per hectare. The greatest part of sunflower production in that period was achieved on small individual farms. In the following period from 1960 on there was a considerable increase of the area under sunflower both on small individual farms as well as on large socially owned agricultural organisations. Although with significant oscillations in some years the volume of sunflower increased several times in the past period, as is shown in the following graph.

The greatest part of Yugoslav production of sunflower is carried out on the area of Serbia (approx. 70%), and on the area of AP Vojvodina on which 45 - 80% of the total of sunflower area in Yugoslavia was planted up to the present period. Sunflower is also cultivated on considerable areas of SR Macedonia and SR Croatia (on approx. 18 to 35% of the total planted area) whereas on the areas of the other republics sunflower production is carried out on a very small area.

3. Economic Effectiveness of Sunflower Production

Under the effect of favourable natural conditions, the usage of new more productive varieties and the achieved level of producing technology in the past period there occurred a significant increase in the intensity of sunflower production, i.e., creating conditions for its economically effective production. In the period beginning from 1960 the obtained average yield of sunflower seed was above 1.5 t/ha (except in 1970 1.36 t/ha and in 1975 1.4 t/ha). The highest average yields of sunflower seed were obtained in 1977 (2.27 t/ha), in 1978 (2.16 t/ha) and in 1979 (2.04 t/ha). The achieved average yield of sunflower seed from the areas of the social large enterprises were, in some years by 3 to 10% higher than the total average, and compared with the achieved average yields on individual farms even 12 to 27% higher. The yields obtained on a number of social large enterprises in the past period which were 3 - 4 t/ha (Table 3), by which Yugoslavia is classified among countries with the highest sunflower seed yield in the world, indicate that considerably higher yields are a real possibility. However, the achieved productive-economic results in the production of sunflower since 1979 started to decrease considerably under the harmful effect of the parasite fungus *Phomopsis* sp. A mass and severe appearance of this plant disease occurred just in the most significant productive area in Vojvodina, so that in the period 1979 - 1983 sunflower seed yield decreased even more than 50%. Therefore, a great number of producers drastically diminished or abandoned completely the production of sunflower in that period. Owing to the application of efficient agro-technical measures and measures for protecting sunflower, as well as producing more resistant hybrids, this problem has been eliminated in a relatively short time, so that this production had again become stimulative for a great number of agricultural producers in Yugoslavia.

FIGURE 1: DEVELOPMENT OF SUNFLOWER PRODUCTION IN YUGOSLAVIA 1950-1985

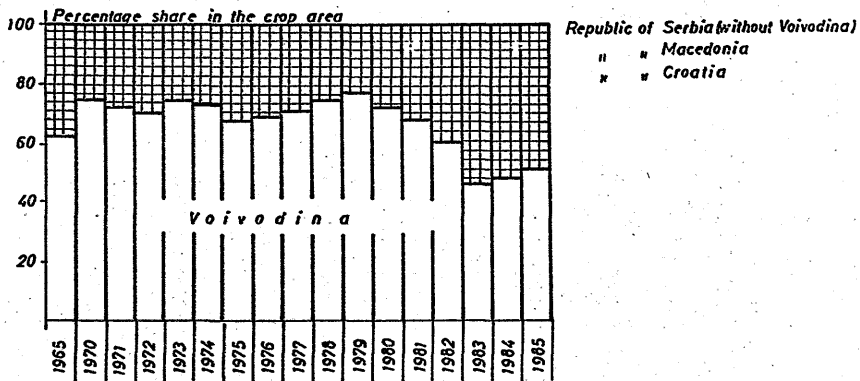
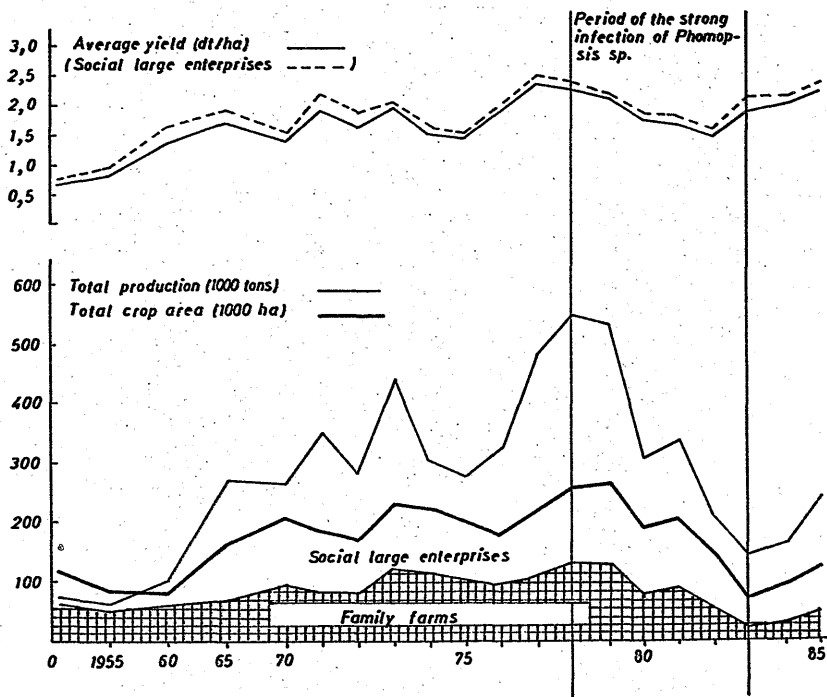


Table 3 - Actual Economic Indicators of the Sunflower Seed Production in the Social Large Farms in Voivodina (1981 - 1986)

	Year	1981	1982	1983	1984	1985	1986
1. Number of farms		34	35	31	24	29	21
2. Sunflower acreage:							
total	(ha)	9,112	7,170	4,114	4,088	5,742	3,553
average per farm	(ha)	268	205	133	170	198	169
3. Average crop yield	(dt/ha)	1,88	1,60	2,17	2,76	2,95	3,01
min - max	(dt/ha)	0,94 - 3,18	0,70 - 2,75	0,84 - 3,89	1,61 - 3,62	2,12 - 3,70	2,41 - 3,52
4. Average selling price	(d/kg)	18,30	25,13	38,22	64,68	107,43	183,13
5. Value of output	(d/ha)	54,371	40,208	82,985	178,319	316,696	551,228
6. Direct costs	(d/ha)	14,623	21,459	33,798	54,346	109,151	232,786
7. Contribution margin	(d/ha)	19,748	18,749	49,187	123,973	207,545	318,442
8. Total costs	(d/ha)	26,102	36,242	56,327	100,416	194,251	418,489
9. Share of overheads (indirect costs)	(d/ha)	43,9%	42,3%	42,0%	45,9%	43,7%	44,4%
10. Average cost price	(d/kg)	13,90	22,65	25,94	36,42	65,89	139,03
min - max	(d/kg)	8,6 - 23,6	8,9 - 48,4	14,1 - 45,8	28,2 - 60,1	38,1 - 105,7	78,8 - 189,1
11. Average surplus profit	(d/ha)	8,269	3,966	26,658	77,903	122,445	132,739
12. Number of farms with loss		3	14	-	-	2	2
13. Average econ. efficiency coeff. (5:8)		1,30	1,11	1,47	1,77	1,63	1,32
<u>Index numbers (1981 = 100)</u>							
Average crop yield		100	85	115	146	157	160
Average selling price		100	137	209	353	587	1001
Value of output		100	117	241	519	921	1604
Total costs of production		100	139	216	385	744	1603
Average cost price		100	163	187	262	474	1000
Average surplus profit		100	48	322	942	1481	1605
Average econ. efficiency coeff.		100	85	113	136	125	102

Source: Final calculations of farms.

In view of the level of achieved yields and the existence of input output relationship, until now, it has been possible to achieve favourable economic results in the production of sunflower, which may be seen from the calculation data of a number of agricultural organizations in the Voyvodina area in the previously table. Although the time period under consideration is characterized by a repeated gradual increase in yield of sunflower seed toward the yield achieved before the harmful attack of the mentioned plant disease, as well as the noticeable aggravation of economic conditions activity (the diminishing of average coefficients of economical efficiency of production from 1.77 to 1.32, satisfactory financial results per unit area have, nevertheless, been obtained in this production. In addition, the increase of the part of sunflower in the structure of crops in social large enterprises, as well as on individual farms, were also caused by the effect of other favourable characteristics of this production, such as:

Table 4. A Comparison of Economical Indicators of Sunflower, Wheat and Soya Production in the Social Large Enterprises in Voyvodina, 1985.

	Production	Sunflower	Wheat	Soya
1. Number of farms		10	18	19
2. Sown area	(ha)	1.035	11.785	5.415
3. Average yield	(dt/ha)	2,74	5,02	1,52
4. Seed appl.	(kg/ha)	5,09	333	110
5. Fertilizer appl.	(kg/ha)	292	719	305
6. Tractor	(hour/ha)	6,73	5,95	7,11
7. Combining	(hour/ha)	2,18	1,68	2,18
8. Labour	(hour/ha)	29,17	32,06	48,90
9. Average selling price	(d/kg)	120,50	41,56	110,06
10. Value of production	(d/ha)	329.810	208.399	167.409
11. Direct costs	(d/ha)	121.310	115.333	101.326
12. Total costs	(d/ha)	207.199	177.944	179.221
13. Average cost price	(d/kg)	75,70	35,49	117,83
14. Average surplus/loss	(d/ha)	+122.611	+30.455	-11.812
15. Average econ. efficiency coefficient (10:12)		1,59	1,17	0,93

Source : Actual Calculations of Farms

- the possibility of mechanized work of all necessary operations i.e., the need of a relatively small amount of human labour,
- the need for lower investment (expenses) per capacity unit compared with other crops, sugar beet, maize, wheat, etc.
- the favourable effect of sunflower in crop rotation,
- the possibility of sowing it somewhat later (which is important in years of unfavourable weather conditions), as well as earlier harvesting,
- using universal mechanization appliances which the agricultural enterprises or the individual farm already possesses for its crop production with the exception of the header on the combine for sunflower harvesting.

The possible degree of economic effect of intensive sunflower production may also be seen by comparative economic parameters obtained in different lines of crops production (Table 4). With the obtained relatively high average yield of sunflower seed of 2.74 t/ha (2.12 - 3.29 t/ha of the observed work organizations), the competitive capability of sunflower production may reach full expression also under conditions of intensive agricultural production.

References:

- ANDRIĆ, K., ŽIVKOVIĆ, D., Mogućnosti i problemi ekonomski efikasne proizvodnje suncokreta u Jugoslaviji. Glasnik poljoprivredne proizvodnje, prerade i plasmana Beograd, 7-8/1984, str. 25-31.
- MUNČAN, P., Prilog proučavanju produktivnosti rada u proizvodnji suncokreta. Organizacija rada Beograd, 12/1983, str. 1-7.
- Proizvodnja suncokreta, uljane repice i rezultati oglada u PIK "Sirmijum" 1983. godine i preporuke agrotehnike za setvu 1984. godine. Poljoprivredno-prehrambeni institut, Zavod za poljoprivredu, Sremska Mitrovica 1984.