Economics of agriculture
SI – 2
UDK: 664.314 (497.11)

ECONOMIC CHARACTERISTICS AND SIGNIFICANCE OF THE OIL PLANT SECTOR IN SERBIA

Dragica G. Božić[1], *Petar M. Munćan*[2]

Summary

Serbia is one of the largest producers of oil crops in Europe, primarily of sunflower and soy bean. In the structure of harvested surfaces under oil crops in Serbia (amounting in the last decade to over 300 000 ha) sunflower takes the first place (almost two thirds of total surface in certain years), followed by soy bean. The lowest share in harvested surfaces under oil crops has the rapeseed, whereas the production of oil pumpkin is only just starting. Increased demand for oil plants on international market in recent years caused significant increase of prices which reflected on the production of these plant cultures.

Objective of this paper is the analysis of the most important economical characteristics and contribution of the oil crops sector to the economical development of Serbia in the period 2000-2008. Principal indicators of the significance of a sector in the total economical development of Serbia were analyzed, share in the Gross Added Value, employment and export. Economical efficiency of the production of main oil crop cultures (sunflower and soybean) on family agricultural households in Serbia has been established.

Main sources of data were publications and internal documents of the Statistical Office of the Republic of Serbia. Calculations of Gross margin which were used to consider economical efficiency of the oil crops production were composed based on elements gathered in performed survey. Survey was performed on 50 selected family agricultural households which are exclusively engaged in crop production.

Key words: *sunflower, soybean, plant oils, gross margin, macro economical indicators.*

1 Phd. Dragica Božić associate professor, Faculty of Agriculture Zemun, Nemanjina 6, 2615-315, e-mail: bozdrag@agrif.bg.ac.rs.

2 Phd. Petar Munćan full professor Faculty of Agriculture Zemun, Nemanjina 6, 2615-315, e-mail: muncan@agrif.bg.ac.rs.

Introduction

Objective of this paper is analysis of the present situation and of economical characteristics of the oil crop production sector, as well as of the contribution of this sector to the economical development of Serbia in the last decade, which was period of significant socio-economical changes. Determination of basic macroeconomic indicators was used to assess the position and significance of the oil crop production sector in the economical structure of the country. The sector has realized significant progress in past few years. This reflects primarily in increase of the land surfaces under oil crops, prices have become relatively stable, consumption of oil on the domestic market has increased, a significant level of profitability of both manufacturers and food processing has been achieved. Positive tendencies in the sector are result of increase of oil crop prices on international market induced by increase of demand, finalized process of privatization of oil plants and increased investments in their modernization and introduction of quality systems, but also certain agricultural policy measures aimed at stimulating production. However, violation of the external price parities of primary agricultural products, including oil plants, and industrial inputs used in this production (mineral fertilizers, fuel, declared seed, etc.) manifested in the last year of analysis, threatens to worsen the economic position of producers also in this sector, and diminish its importance for total economical development of the country.

Method and Data Sources

Main sources of data were publications of the Statistical Office of the Republic of Serbia and various documentation materials of this institution. Also, data of the Ministry of Agriculture, Forestry and Water Management of Republic of Serbia were used. Common mathematical-statistical methods were applied to establish basic economic characteristics of the oil crop production sector. Basic macroeconomic indicators (share of oil crop production in Gross Agricultural Output GAO, share of the industry of refined plant oils in Gross Value Added – GVA of the industry of food products and beverages, and share of the sector in foreign trade) were applied in the consideration of the relevance of this sector in economic structure of the country. Calculations of Gross margin which were used to consider economical efficiency of the oil crops production were composed based on elements gathered in performed survey. Survey was conducted on 50 selected family agricultural households which are exclusively engaged in crop production, and within it, production of oil crops.

Results and Discussion

1. Main characteristics of oil crop production in Serbia

Total surfaces under oil crops in Serbia, in the analyzed period, were approx. 300 000 ha (table 1). The highest share within the structure of harvested oil crops

have surfaces under sunflower, approx. 200 000 ha in year 2003. Rapeseed had the lowest share in harvested surfaces, however in recent years a significant increase in this production has been recorded (average annual rate of 14,08 %).

Production of sunflower and soybean has more than doubled, and production of rapeseed has increased almost five times in the observed period. Measures of the agricultural policy have considerably contributed to these tendencies (production premiums, direct payments per hectare, reimbursement of inputs, incentives for procurement of mechanization, etc.).

Table 1. Harvested surfaces and oil crop production in Serbia

Year	Sunflower		Soy bean		Rapeseed	
	Surface (ha)	Production (t)	Surface (ha)	Production (t)	Surface (ha)	Production (t)
2000	146 415	217 608	141 559	170 593	6 273	10 467
2001	163 155	317 878	87 382	207 051	3 222	5 479
2002	150 183	279 831	100 047	244 293	4 432	6 311
2003	199 381	353 784	131 403	225 963	3 212	3 809
2004	188 698	437 602	117 270	317 836	1 896	4 531
2005	197 843	350 762	130 936	368 023	1 730	3 333
2006	186 431	384 945	156 680	429 639	3 873	7 595
2007	154 793	294 502	146 988	303 950	12 934	29 604
2008	187 822	454 282	143 684	350 946	17 996	51 907
P	3,16	9,64	0,19	9,44	14,08	22,16

Source: Calculation by authors based on data of the Statistical yearbooks of Serbia, relevant years, the Statistical office of the Republic of Serbia, Belgrade.

Realized average yields of sunflower in the reporting period varied in the range from 1,5 t/ha in year 2000 to 2,4 t/ha in 2008. In production of soy bean, the lowest yield was achieved also in year 2000, only 1,2 t/ha, whereas the highest yield of 2,4 t/ha was achieved in 2008.

Production of sunflower and soybean is mainly realized on family agricultural households, and their share in the reporting period for sunflower production has increased from 59% in 2000 to 74% in 2008, and in soy bean production from 41% in 2001 to 61% in the last year of the analysis.

Violation/disruption of external price parities in the last year of analysis compared to previous year was to the detriment of producers of oil crops, due to constant rapid increase of input prices, which indicated some deterioration of their economic status (table 2).

Table 2. Price parities for sunflower, soy bean and inputs

Products/inputs	Year			
	2005.	2006.	2007.	2008.
Sunflower	1,00	1,00	1,00	1,00
Sunflower seed	110,00	163,33	71,33	99,17
Mineral fertilizer NPK 15:15:15	1,15	1,20	0,66	1,31
Mineral fertilizer UREA	1,21	1,40	0,73	1,25
Diesel fuel D_2	4,37	4,53	2,22	3,75
Soy bean	1,00	1,00	1,00	1,00
Soy bean seed	2,25	2,50	1,32	2,16
Mineral fertilizer NPK 15:15:15	1,06	1,13	0,71	1,21
Mineral fertilizer UREA	1,12	1,31	0,78	1,15
Diesel fuel D_2	4,04	4,25	2,38	3,46

Source: Calculation by authors based on results of the survey conducted on family households

Established price parities have caused increase in variable costs of the production and decrease of the realized gross margin in production of sunflower. However, thanks to relatively low prices of oil crops, realized gross margins are still relatively high, and considerably higher compared to their level recorded in the first reporting year (tables 3 and 4).

Table 3. Calculation of gross margin in sunflower production

Elements	Years			
	2005.	2006.	2007.	2008.
Yield t/ha	1,8	2,1	2,0	2,4
Market price, RSD/t	12.000	15.000	30.000	26.000
A) Production value, RSD/ha	**21.600**	**31.500**	**60.000**	**62.400**
B) Material				
- seed	1.320	2.450	2.140	2.380
- NPK 15:15:15	2.760	3.600	4.000	6.300
- UREA	2.900	4.200	4.400	6.000
- Plant protection preparations	2.450	2.920	3.540	3.820
- Diesel fuel	4.725	6.120	5.985	8.100
- Custom harvesting	5.100	5.250	6.540	6.850
V) Total variable expenses	**19.255**	**24540**	**26.605**	**33.,450**
G) Gross margin G = (A-V)	**2.345**	**6.960**	**33.395**	**28.950**

Source: Calculation by authors based on results of the survey conducted on family households

Table 4. Calculation of gross margin in soy bean production

Elements	Years			
	2005.	2006.	2007.	2008.
Yield t/ha	2,8	2,8	2,1	2,5
Market price, RSD/t	13.000	16.000	28.000	28.000
A) Production value, RSD/ha	**36.400**	**44.800**	**58.800**	**70.000**
B) Material				
- seed	23.,504	4.800	4.440	6.720
- NPK 15:15:15	2.760	3.600	4.000	6.300
- UREA	2.900	4.200	4.400	6.000
- Plant protection preparations	2.120	2.640	3.080	3.620
- Diesel fuel	4.725	6.120	5.985	8.100
- Custom harvesting	5.100	5.250	6.540	6.850
V) Total variable expenses	**21.109**	**26.610**	**28.445**	**37.590**
G) Gross margin G = (A-V)	**15.291**	**18.190**	**30.355**	**32.410**

Source: Calculation by authors based on results of the survey conducted on family households

2. Characteristics of industrial processing of oil crops in Serbia

Privatization in this sector was finalized in year 2005, which has significantly contributed to inflow of investments, considering that new owners have invested into modernization of the processing facilities and improvement of the quality systems. There are in total nine industrial plants engaged in processing of oil crops in Serbia[3] Most of the industrial oil crops processing facilities are located in AP of Vojvodina.

Although in production of oil crops relatively high yield are realized (higher in comparison to majority of surrounding countries, as well as EU countries), primarily thanks to good natural conditions and long tradition in this production, satisfactory price competitiveness is not accomplished within the sector, since acquired advantage in production of oil crops is lost in the processing[4]. Mentioned deficiencies in the sector are eliminated with reduction of the oil price, so that competitiveness can be increased in the pre-accession period and to ensure certain stability to producers even after joining the EU.

3 Seven oil plants process sunflower, soy bean and rapeseed, whereas two process only soy bean. Single producer of bio-diesel is «Viktorija oil»-Šid. In addition to said capacities, there are also small plants for production of cold pressed oils (eight), as well as numerous extrusion plants as integral parts of agricultural companies and cooperatives producing livestock feed where principal component is soy bean..

4 Average utilization of installed capacities for processing of oil plants in Serbia (according ti data of MAFWM) is low, and in recent years it was 25-33%. Therefore, fixed costs per unit of final product are relatively high and increase considerably the price of oil produced in Serbia, i.e. the competitiveness of domestic oil on the international market is reduced.

Production of refined oils in Serbia in the analyzed period has increased from 69 to approx. 102 thousand tons, i.e. around 45% (table 5). Production in the oil sector in the recent period has ensured increased domestic consumption and certain quantities for export.

Table 5. Tendencies in production of refined plant oils in Serbia*

	Year								
	2000	2001	2002	2003	2004	2005	2006	2007	2008
Production (t)	69986	84159	83108	88 571	101593	102659	108483	123386	101778
Index(2000=100)	100.0	120,3	118,7	126,5	145,2	146,7	155,0	147,7	145,4

* refined plant oils for consumption

Source: Calculation by authors based on data of the Statistical yearbooks of Serbia, relevant years, the Statistical office of the Republic of Serbia, Belgrade.

3. Economical relevance of the sector in the economical development of Serbia

Value of the sunflower production was approx. 2,5 %, and of soy bean approx. 2% of Gross Agricultural Output of Serbia and marked increase of their share in the reporting period was registered (table 6). Share of rapeseed was modest and amounted to0.3% in 2008.

Table 6. Share of the production value of sunflower, soy bean and rapeseed in Gross Agricultural Output-GAO

	2001	2002	2003	2004	2005	2006	2007	2008
Gross agricultural output-total* (000 000 EUR)	2463	3270	3131	3623	3161	3378	3561	4493
Share of the production value of sunflower (%)	1,40	1,52	2,07	1,98	1,68	1,83	1,78	2,59
Share of the production value of soyabean (%)	1,02	1,51	1,48	1,60	2,06	2,36	1,89	1,93
Share of the production value of rapeseed (%)	0,02	0,02	0,02	0,02	0,02	0,04	0,17	0,34

*- includes agriculture, hunting and corresponding services

Source: Calculation by authors based on data contained in Documents of the Statistical Office of the Republic of Serbia.

In the reporting period, share of the industry of refined plant oils and fats in Gross Value Added (GVA) of the food and beverage industry was maximum 7,7 % in year 2002. (table 7).

Table 7. Share of the industry of refined plant oils and fats in Gross Value Added (GVA) of the food and beverage industry

	2002	2005	2007	2008
Gross Value Added (GVA) of the food and beverages industry (mil. RSD)	43632	66997	90194	101087
Gross Value Added (GVA) of the refined plant oils and fats industry (mil. RSD)	3356	3966	3336	5325
Share of the industry of refined plant oils and fats in Gross Value Added (GVA) of the food and beverage industry (%)	7,7	5,9	3,7	5,3

*- refers all GVA companies

Source: Calculation by authors based on data contained in Documents of the Statistical Office of the Republic of Serbia.

Share of the industry of refined plant oils and fats in total employment within the food and beverages industry is approx. 3 %, with marked decrease of number of employees.

Since 2005, Serbia became a net exporter of agricultural and food products. In the structure of export of oil products, the most significant are sunflower and soy bean oil (raw and refined). Export value of these products considerably exceeds the import value. Share of these oils in the structure of total import of agricultural food products in Serbia has increased from approx. 2,0% in 2003 to 7% in 2008 (table 8). In the structure of export value of oils, refined and raw sunflower oils are most present (over 3% of total agricultural export), followed by soy bean oil (increase of share to over 2%), whereas the share of rapeseed, in spite of recorded increase, in the last year was 1,3% of total export of agricultural food products from Serbia.

Table 8. Share of plant oils in the export and import of agricultural food products in Serbia, in the period 2000-2008

	2000.	2001	2002	2003	2004	2005	2006	2007	2008
Export, total (mil. USD $)	1558	1721	2075	2756	3523	4482	6427,9	8824,8	10973
Total agro- food products	295,6	316,7	534,1	584,0	800,1	924,4	1265,6	1685,8	1957,5
Of which industrial plant oils (%)	4,3	4,3	2,6	2,0	6,9	4,1	2,0	5,2	7,0
Import, total (mil. USD $)	3330	4261	5614	7477	10753	10461	13172,3	18553,6	22875
Total agro- food products	286,7	453,1	548,7	654,2	855,6	772,8	905,6	1122,1	1467,9
Of which industrial plant oils (%)	0,3	0,2	0,5	0,1	0,0	0,0	1,7	1,0	1,1

*- included are raw and refined sunflower, soy bean and rapeseed oils

Source: Calculation by authors based on data contained in Documents of the Statistical Office of the Republic of Serbia.

In addition, it is apparent that share of import of said oil types, after year 2005, when extremely low import value was recorded, mainly ranged around 1% of total import of agricultural food products (except in 2006 when it was 1,7%). The most significant import product in the sector of oil production is soy bean meal, with share of approx. 1% of import of agricultural food products in some years.

Export of sunflower oil is mainly directed towards CEFTA countries, whereas the export of soy bean oil is mainly directed towards EU countries. Due to lack of price competitiveness of these products on EU market, it is necessary to invest significant efforts to increase the efficiency of this production. Since 2004, export incentives for oil products were introduced (raw and refined oils, as well as soy bean products).

Conclusion

Determined macroeconomic indicators indicate that the oil crop production sector has important role in total economical development of Serbia, and this is expected also in future period (subsequent to joining EU). However, in order to achieve these goals, corresponding supporting policy is necessary. In addition to direct support for producers, it can be achieved through investment incentives (for producers of oil crops in procurement of mechanization and irrigation systems, in order to increase the productivity, i.e. competitiveness; also for oil plants, investment incentives which would result in reduction of oil prices and solving of the environment protection issues). Through agreements with neighbouring countries, signatories of the CEFTA Agreement, it is necessary to ensure respecting of all agreed exchange rules and procedures. Also, it is important to ensure the support for the sector in negotiation processes within WTO, and EU accession.

References

1. Bogdanov Natalija, *Božić Dragica* (2003): Analiza efekata pridruživanja EU, izveštaji eksperata, redaktor Milena Jovičić**,** poglavlje «Poljoprivreda i agroindus trija»,Ekonomskifakultet,Beograd h*ttp://www.plac.yu.org/downloads/1.1.2Analiza efekatapridruzivanjaEUIzvestaji/pdf* ;
2. Bogdanov Natalija, *Božić Dragica* (2003): Analiza efekata pridruživanja EU**,** redaktor Milena Jovičić, istraživanje na terenu, poglavlja «Poljoprivredna proizvodnja» i «Prerada poljoprivrednih proizvoda», Ekonomski fakultet, Beograd;
3. Janković Snežana i sar. (2007.): *Poslovanje poljoprivrednih gazdinstava u Srbiji u 2006*., Institut za primenu nauke u poljoprivredi, Beograd;
4. Muncan P., Božić Dragica, Bogdanov Natalija (2009): «Production structure and sustainable income – farm models in Serbia», Agriculture The Annals of Valahia University of Targoviste, Ministry of Education, Research and Innovation, Targoviste, Romania;
5. Muncan P., Božić Dragica, Bogdanov Natalija (2010): Ekonomska efikasnost proizvodnje ratarskih kultura na porodičnim gazdinstvima u AP Vojvodini, Ekonomika poljoprivrede, broj 1, Beograd.