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THE PROSPECTS OF INDUSTRIAL ORGANIC PLUM PRODUCTION AND PROCESSING IN EAST SLAVONIA

PERSPEKTIVA PROIZVODNJE I PRERADE INDUSTRIJSKE ORGANSKE ŠLJIVE U ISTOČNOJ SLAVONIJI

ABSTRACT

The paper deals with the profitability issue of industrial organic (ecological) plum production as well as the profitability of its processing into dried plums in East Slavonia. The authors explore the production prospects of both respective products on the basis a cost-benefit analysis and a production-cost analysis. The analysis is based on historical pre-feasibility study data, which is used as a basis to draw conclusion about production profitability. The trend of deteriorating weather conditions during the past several years, which has a huge impact on the overall agricultural production, is taken into consideration as well. The paper aims to prove the prospects of investment potential in East Slavonia on the basis of a real-life plum production and processing example. The numerical variables used in the analysis are precise and based on market research and financial-analysis methodology. In addition, a conclusion about the plum production is presented.

Key words: *plum, conventional and organic production, profitability*

SAŽETAK

U radu se obrađuje problematika rentabilnosti proizvodnje poljoprivredne kulture industrijske organske (ekološke) šljive i njezine prerade u proizvod organske sušene šljive na području istočne Slavonije. Autori istražuju perspektivu proizvodnje oba spomenuta proizvoda temeljem analize troškova i koristi i financijske analize koštanja proizvoda. Rezultati takve analize temelje se na podacima iz prošlosti i sažeti su u obliku pre fesability studije na osnovi koje se donose zaključci o ekonomičnosti proizvodnje. Autori u obzir uzimaju i trend pogoršanja vremenskih uvjeta unazad nekoliko godina, a koji su uzrok kvantitativnog smanjenja poljoprivredne proizvodnje. Cilj je rada dokazati na primjeru proizvodnje i prerade šljive perspektivu investicijskog potencijala Istočne Slavonije. Numeričke vrijednosti koje se u radu upotrebljavaju su egzaktne i temelje se na

marketinškom istraživanju i metodologiji financijske analize. Na kraju se daje zaključak o snimljenom stanju u proizvodnji ove poljoprivredne kulture.

Ključne riječi: *šljiva, konvencionalna i organska proizvodnja, rentabilnost.*

1. Introduction

In 2010, the Ministry of Agriculture approved the „Action plan for the development of organic agriculture in the Republic of Croatia for the period of 2011 to 2016". According to the official data from the study „The world of organic Agriculture – Statistics & Emerging trends 2010", the global organic agricultural land surface grows on average by 9% p.a. According the same study, the largest areas of organically managed agricultural land are registered in Oceania (12.1 million hectares), Europe (8.2 million hectares) and Latin America (8.1 million hectares).

Some 32.036 hectares of organically managed and supervised agricultural land was registered in the Republic of Croatia at the end of 2011. Around 69,2% of it refers to plough-fields, while 6,4% relates to permanent plantations (orchard). The organically managed agricultural land in the Republic of Croatia tripled compared to 2008.

According to the Act on Organic Production of Agricultural and Food Products („Narodnenovine" 12/2001, 14/2001 i 79/2007), the aim of organic production is humans' health and life protection as well as the protection of environment and consumers. The organic production is defined as a "specific system of sustainable agricultural and forestry management, which covers plant cultivation and animal breeding; food, commodity and natural fibre production and primary product processing. It includes all ecological and socio-economically accepted production-technological methods, procedures and systems, which most favourably use land and water, plants', animals' and environments' natural attributes, the improvement of plants' resistance based on natural forces and laws with prescribed usage of organic fertilizers, plant and animal remedies, in accordance with international norms and principles. "[16]

The aim of the „Action plan for the development of organic agriculture in the Republic of Croatia for the period of 2011 to 2016" is an increase of organically managed agricultural land in the Republic of Croatia to 8% of total agricultural land which is around 90.000 hectares and some 5.000 of registered organic agricultural producers.

As far as plumsare concerned, they are one of the oldest fruits. First written evidence on plum cultivation dates from ancient Greece (around 500 BC). Tsar Diocletian cultivated plums in Podravina, Posavina and Bosnia. At the time when Slavs arrived to the areas of today's Croatia, plum plantations have already existed. Plums originate from Western Asia and are cultivated on all continents.

Major producers of plums suitable for drying processing are the United States and France. Two most cultivated plum species suitable for drying processing are „aženka" (prune d' ete) and „požegača". Since the end of twentieth century the biggest global plum producers have imposed the plum corpulence as a major profitability factor. Accordingly, the most cultivated plum species since the second half of the twentieth century in the United States has been the species "Stanley". The characteristics of the new species are its height (48,2 mm), width (35,1 mm) and a simple de-seeding process. Besides, the "Stanley" plum contains highly favourable mechanical and chemical ingredients for drying processing, is robust and easy to transport.

[16]http://www.azrri.hr/fileadmin/dokumenti-download/AKCIJSKI_PLAN_RAZVOJA_EKOLO%C5%A0KE_POLJOPRIVREDE_ZA_RAZDOBLJE_2011-2016.pdf

2. Methodology

The data on which this paper is based are mostly secondary source data and are retrieved from publications such as the statistical year book, electronic publications of the government of the Republic of Croatia and other electronic data sources. Besides, other scientific literature on plum production and processing was consulted as well.

The primary data collection on agro-production technology for the purposes of this paper was conducted by interviewing agronomists from the Agro-Consulting Office. Information on prices of major raw materials, agricultural machinery, seedlings and other assets were collected. Market research was conducted and relevant data (prices) for a financial cost-benefit analysis were collected.

The financial analysis used for the purposes of this paper included all data collected from the primary and secondary sources as well as from expert-consulting sources. Based on this data, a projection of a 25-year production plan was developed. Total plum plantation costs and projected returns for the respective period were used to calculatethe organic plum production cost and discount it to its present value. The details on methodology are explained in the next chapters.

The cost price of organic industrial plum is a direct input cost into organic dried plum processing. The total production cost of an organic dried plum was compared to prices of other organic dried plums sold in supermarkets in the EU. Finally, a conclusion on profitability was established.

3. Research results

Two entrepreneurial ventures were analysed. Entrepreneur "A" is an organic industrial plum producer in East Slavonia. He invests into permanent plum plantations. He buys land (4 pieces x 5 hectares), adjusts the land for planting and conducts all other needed investments during the period of 5 years when no full harvest is expected. After 20 years, he manages permanent plum plantations (plum species "Stanley"). He permanently employs two employees, while additional employees are employed during harvest seasons. His market is the organic dried plum processing industry, which he supplies with the plum as a major commodity. The analysis includes the possibility that the investor is an employee at same time, which positively affects the profitability of the project. The data from table 1 are based on scientific and expert literature as well as a real-life list of investments and expenses for permanent plum plantations. Presented data are confirmed by agro-consultants specialized in organic production. Entrepreneur "A" invests 3.000.000 kn of its own capital and additional 2.000.000 kn as a 20-year loan with 4% interest rate. The loan has a grace period of 5 years. Interests are recognized as annual costs during the respective period, while the loan is used for investments into long-term assets which are depreciated over the respective period. The plum yield is reduced by 10%, which represents a correctivefactor due to expected deteriorating weather conditions (draught, flood etc.), while the assumed redemption price for organic plums is 20% lower compared to the current price. By applying such a corrective factor, the risks for two major and most sensitive variables (price and yield quantity) are reduced. In our case study, the entrepreneur buys 20 hectares of land in the first project year, while he sells the respective land in the last project year (2038) at the price which is corrected for the inflation rate of 3% p.a. Land is the only asset in our project which is not being depreciated.

Table 1: List of costs and investments, profit and loss projections, cash flow projections for the period of 2014 - 2038

ENTREPRENEUR „A“ – AGRO-PRODUCER: COST-BENEFIT ANALYSIS											
	INVESTMENTS	UNIT	QUANTITY	kn/UNIT	2014.	2015.	2016.	2017.	2018.	2019.-2028.	2029.-2038.
1	Land (4x)	ha	20	50.000	1.000.000						
2	Technological project - plantation	pcs	1	50.000	50.000						
3	Seedlings	pcs	10000	95		1.007.855					
4	Soil analysis and adjustment	ha	20	11.590		245.917					
5	Organic fertilizers	kn					53.544	77.885	107.117		
6	Replanting and other	kn					26.444	27.462	1.275		
7	Maintenance	kn					78.676	99.045	125.202		
8	Special maintenance	kn					73.431	91.166	83.468		
9	Fence h = 2,3 m	m^1	510	74		40.038					
10	Draw-well and concessions	pcs	4	170.000		721.412					
11	Watering system	m^1	37500	4		143.420					
12	Machinery	kn							1.391.129		
13	TOTAL INVESTMENTS	kn			1.050.000	2.158.642	232.095	295.559	1.708.190		
	COSTS										
11	Depreciation – plantation and other assets	kn								1.526.679	1.526.679
12	Depreciation machinery	kn								695.564	695.564
13	Organic fertilizers	kn								1.401.699	1.883.767
14	Replanting and other	kn								15.057	20.236
15	Packaging	kn							28.500	2.080.648	2.796.216
16	Harvests	kn							144.000		
17	Permanent employees	contract	2	55.000						1.505.732	2.023.578
18	Temporary employees	contract	5	25.000						1.711.059	2.299.520
19	Loan interest	kn								1.190.000	1.190.000
19	TOTAL COSTS	kn							172.500	10.126.439	12.435.560
20	Revenue (- 10 %)	kg						40000	100000	3460000	4000000
21	REVENUE	kn		3,75				168.826	434.728	17.760.792	27.594.241
22	PROFIT	kn						135.061	209.782	6.107.483	12.126.945
	CASH FLOW										
1	Investment activity inflows – outflows	kn			-1.050.000	-2.158.642	-232.095	-295.559	-1.708.190		2.093.778
2	Business activity inflows – outflows	kn							262.228	11.046.597	18.570.924
3	Financial activity inflows - outflows	kn					2.000.000			-3.412.243	-3.412.243
4	±Cash flow				-1.050.000	-2.158.642	1.767.905	-295.559	-1.445.963	7.634.353	17.252.459

*Source: Krpina, I. I suradnici (2004): **Voćarstvo**, Nakladni zavod Globus, Zagreb (page 145.-146.), and interviews with the employees from theAgro-Consulting Office in Vinkovci*

Discounted cash flows for the period of 2014 – 2038

Table 2 Financial indicators

INVESTOR: CORPORATION		INVESTOR: FAMILY FARM (OPG)	
NPV	715.000 kn	NPV	1.650.000 kn
DR	10 %	DR	10 %
IRR	11,9 %	IRR	14,3 %

Source: authors

The net present value (NPV) of the investment into permanent organic plum plantation with the discount rate of 10% (5% interest rate on time deposits + 5% other additional risks) is 715.000 kn. The internal rate of return (IRR) is 11,9%.

In a case where a family farm (OPG) is an investor, the net cash flow is corrected for the expected wages and salaries during the project time-period. In such a case the net present value (NPV) is 1.650.000 kn, while the internal rate of return(IRR) is 14,3%.

Total investment outflows and present value of organic plum cost price

Total investment outflows which represent either time-period costs or are registered as depreciation costs (land is not being depreciated) are 27,278.895 kn nominally. Investment outflows during the plantation usage period are based on current market prices corrected for 3% p.a. due to expected inflationary pressures.

Discounted nominal investment outflows for the time-period of 25 years with the discount rate of 5% on the present value (PV) are 15.401.812 kn. In this case, outflows are being discounted with a discount rate which is equivalent to commercial bank fixed-term deposit rate. The present value (PV) divided by total expected yield of 7.600 tonnes gives us a weighted average organic plum cost price of 2,03 kn/kg.

Table 3 Present value of weighted average cost price for organic plum for the period of 2014-2038

NOMINAL CASH OUTFLOWS 2014 - 2038	27,278.895 kn
DISCOUNT RATE	5 %
PRESENT VALUE OF CASH OUTFOWS 2014 - 2038	15.401.812 kn
TOTAL EXPECTED RETURN	7.600 t
PV WEIGHTED AVERAGE COST PRICE (ORGANIC PLUM)	2,03 kn / kg

Source: authors

The market price of organic industrial plums on the domestic market was 3,60kn (+VAT) last year. Based on such data we can draw a conclusion that the gross profit margin for the organic plum of the entrepreneur “A” is 77% on the base-cost price. In our cost-benefit analysis we assume that the future real market price will be 20% lower due to supply increase. In such a case, the gross profit margin would be 47%. If we do the calculation for a family farm (OPG), the gross profit margin for the owner would be even higher.

Table 4 Organic dried plum production – calculation

ENTREPRENEUR „B“ – PROCESSING						
MONTHLY COST CALCULATION – ORGANIC DRIED PLUM (PACKAGING 200 g)						
	COSTS	UNIT	QUANTITY	PRICE/UNIT	factor	AMOUNT
1	GENERAL PRODUCTION COSTS					57.500,41
2	Wages and salaries	kn		18.000,00	1,25	22.500,00
3	Depreciation	kn		7.917,00	1,25	9.896,25
4	Energy and telecommunication	kn		2.800,00	1,25	3.500,00
5	Daily and travelling allowances	kn		700,00	1,25	875,00
6	Consumables	kn		500,00	1,25	625,00
7	Maintenance and other services	kn		1.500,00	1,25	1.875,00
8	Quality systems: ISO, HACCP, EKO	kn		8.333,33	1,25	10.416,66
9	Cold storage 750 t	kn		6.250,00	1,25	7.812,50
10	DIRECT PRODUCTION COSTS					86.420,00
11	Plums	kg	11000	3,00		33.000,00
12	Gas	m^3	3000	2,50		7.500,00
13	Electricity	kWh	1000	1,50		1.500,00
14	Wages and salaries	h	704	30,00		21.120,00
15	Maintenance and spare parts	kn		1.000,00	1,25	1.250,00
16	Depreciation	kn		8.400,00	1,25	10.500,00
17	Packaging	kom	16.500	0,70		11.550,00
18	OTHER GENERAL COSTS					53.872,79
19	General production costs	%	50%			28.750,21
20	Administration	%	50%			16.296,88
21	Cost provisions	%	5%			8.825,71
22	TOTAL COSTS	kn				140.292,79 kn
23	UNITS PRODUCED IN 22 DAYS	20 dkg	**16.500**			
24	PRICE – ORGANIC DRIED PLUM 200 g	kom				**8,50 kn**
25	PRICE – ORGANIC DRIED PLUM 200 g	kom				**1,13 €**

Source: authors

Entrepreneur “B“ is a small entrepreneur in East Slavonia. He is engaged in fruit processing business and owns all needed processing equipment, cold storage and other needed assets. The entrepreneur employs 20 employees. The market for his products is the organic product market. We assume that the entrepreneur will sell his products on EU markets. Entrepreneur “B“ buys organic plums from the entrepreneur “A“ at a market price. During a period of two months within a year, the entrepreneur processes the organic plum into a final product (dried plum). The cost price for 200g of dried organic plums is 1,13€ or 8,50 kn (all costs included). We assume (based on agro-

consultancy data) that out of 1kg of organic plum (species “Stanley”), 300g of dried organic plums can be produced.

The retail price of the same product on EU markets is 3,50€. If 19% for VAT and 40% for trade margin and transport costs are subtracted, we arrive at a price of 15,30kn/unit. Based on such calculation, we can conclude that the producer can reach very high gross profit margins of more than 80%.

4.Conclusion

Not enough industrial organic plums are produced on the territory of East Slavonia. The only bigger producer, who bought negligible quantities of organic industrial plums and processed it into organic plum juice, last year, is located in Baranja. Neither the production of organic industrial plum (species “Stanley”) nor the capacities for drying processing do exist. Even if processing capacities would exist, larger quantities of processing would not be possible since there is not enough industrial organic plum in the Republic of Croatia. It is possible to find suitable land for organic plum plantations in East Slavonia by conducting a soil analysis. As far as the profitability issue is concerned, the production and processing prospects for organic industrial plum (species “Stanley”) are very positive. A family farm can tie its whole life cycle to a permanent plantation of such a culture and have very good profitability prospects. In a base case scenario, a gross profit margin of 50% per unit can be expected. A small fruit processing business can use domestically grown organic plums and process them into highly profitable final product (dried plums) with an expected gross profit margin of more than 70% in a base case scenario.

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