

ECONOMIC IMPACTS OF INVESTMENTS IN VALUE-ADDED PRODUCTS

EKONOMSKI UTICAJ ULAGANJA U PROIZVODE SA DODATOM VREDNOŠĆU

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ABSTRACT

Stone fruit plantations constitute more than two-thirds of all fruit plantations in Serbia (approximating to 67%), whereas plum plantations account for two-thirds of all stone fruit plantations in the country. Stone fruit production is commonplace in all parts of Serbia. There are large areas of extensive fruit plantations in Western Serbia and Šumadija (Valjevo, Kraljevo, Užice, Bajina Bašta and Kragujevac), whereas the largest fruit plantation areas are in the municipalities of Grocka, Smederevo, Prokuplje, Topola and Valjevo. Plum plantations are estimated to claim the biggest share of extensive fruit plantations in Serbia. A value chain is a powerful tool for increasing the added value of products. It represents a synthesis of activities carried out by a business organization in order to produce, pack, design, market, deliver and support its products. In the production of dried plums with stones, with an average production of 112 kg/day and an average selling price of 350 RSD/kg, the realized profit amounted to 18,237 RSD/day (for 24 hours of drying). With an average drying ratio of 4:1 (100 kg of fresh plums yield 25 kg of dried plums with a moisture content of 26 %), the added value of dried plums is increased approximately 6 times compared to fresh plums. According to the economic indicators calculated in the organic production of plums, a positive financial result (profit) of 3.940 €/ha was achieved. The cost price of plum production was 0.16 €/kg, and the selling price was 0.38€/kg. As the organic production of plums generates profit and the cost price per unit of measure is significantly lower than the purchase price of plums (0.16 €/kg < 0.38 €/kg), the organic production of plums is economically justified for the producer.

Key words: value-added products, dried plums, investments, impacts

REZIME

Preko dve trećine zasada voća u Srbiji čine koštičave voćne vrste (oko 67%), a u okviru toga, dve trećine otpada na šljivu. Proizvodnja koštičavih voćnih vrsta je zastupljena u svim delovima Srbije. U Zapadnoj Srbiji i Šumadiji se nalaze veće površine ekstenzivnih zasada (Valjevo, Kraljevo, Užice, Bajina Bašta, Kragujevac), a najveće površine pod plantažnim zasadima su u opštinama Grocka, Smederevo, Prokuplje, Topola i Valjevo. Procenjuje se da najveći udeo ekstenzivnih zasada u Srbiji čine zasadi šljive. Lanac vrednosti predstavlja snažan instrument za pronalaženje načina za stvaranje veće »dodate« vrednosti za proizvode. Organizacija lanca vrednosti čini sintezu aktivnosti koje se obavljaju u cilju proizvodnje, pakovanja, dizajniranja, marketiranja, isporuke i podrške njenim proizvodima. U proizvodnji sušene šljive sa košticom, pri prosečnoj proizvodnji od 112 kg /dan i prosečnoj prodajnoj ceni od 350 din/kg, ostvarena dobit je iznosila 18.237 din/dan (za 24 sata sušenja). Pri prosečnom randmanu 1:4, odnosno ukoliko se od 100 kg sveže šljive može proizvesti 25 kg sušene šljive vlažnosti 26%, onda je dodata vrednost sušene šljive veća za oko 6 puta u odnosu na svežu šljivu. Prema ekonomskim pokazateljima utvrđenim u kalkulacijama u organskoj proizvodnji šljive postiže se pozitivan finansijski rezultat (dobitak) u iznosu od 3.940 €/ha. Cena koštanja šljive je 0,16 €/kg, a prodajna cena 0,38 €/kg. S obzirom da se u organskoj proizvodnji šljive postiže dobit, kao i da je cena koštanja po jedinici mere znatno niža u odnosu na prodajnu (otkupnu) cenu šljive (0,16 €/kg < 0,38 €/kg) organska proizvodnja je ekonomski opravdana za proizvođača.

Ključne reči: dodata vrednost proizvoda, sušena šljiva, investicije, ekonomski efekti.

INTRODUCTION

As the most important fruit species cultivated in Serbia, plums predominate in the structure of the total Serbian fruit production. Apples and other fruit crops immediately follow according to the production volume, whereas quinces claim the smallest share of the total fruit production in the country (Vlahović, 2015). The extensive production of plums in Serbia was facilitated by favourable natural conditions and modest care requirements. The plum is also well managed in hilly and mountainous regions, where it produces regular and satisfactory yields provided the appropriate cultural practices are used.

Dried plums used to be one of the main export products of Serbia. Unfortunately, the country nowadays imports dried plums partly owing to the necessary (conditional) exchanges, and partly because the quality of our dried plums is not at a high level (Zlatković, 2003). To obtain quality dry plums, it is

necessary to select appropriate plum cultivars. According to Mitrović Olga et al. (2006), the best plum cultivars for drying are 'Požegača' and 'Valjevka', whereas the most suitable cultivar is 'Čačanska rodna'. Much more attention should be paid to marketing activities, which implies a high quality of dry plums, attractive packing and packaging design, adequate price, timely distribution and appropriate promotional activities in order to recover lost markets.

Processed fruit have a significant share in the structure of the total exports of Serbia, requiring a modern and highly productive fruit processing industry for the further improvement of their quality. The export-oriented development of the processing industry necessitates a significant raw material base, the production of quality fruit, constantly expanding fruit-based assortments, new solutions in the technology of fruit production and processing, the application of safety standards, etc.

At present, Serbia is both an importer and an exporter of dried plums (with dried plum imports significantly lower than exports). In the period under consideration (2006-2013), the average value of dried plum exports from the Republic of Serbia amounted to 3,934 tons (approximately 8 million \$) with a growing trend of 15 % per year (www.fao.org). The smallest export was realized in 2006 (1,377 t) and the highest in 2013 (7,209 t).

Therefore, the purpose of this paper is to analyse the production of value-added fruit commodities with an emphasis on the economic impacts of investing in the dried plum production on family farms in Serbia.

MATERIAL AND METHOD

Favourable natural conditions, as well as an enduring tradition of plum growing and processing (especially in brandy production), were the impetus for establishing plum plantations in the past. At present, the following plum cultivars are gaining prominence and are increasingly grown: 'Čačanska lepotica', 'Stanley' and 'Čačanska rodna'. However, 'Čačanska rana', 'Timočka' and 'Čačanska najbolja' are present to a lesser extent. In addition to fresh fruit production and marketing, value-added fruit products have been receiving increased emphasis (semi-processed, processed, organic, with protected geographical status (PGS), etc.), accompanied by a growing demand in the market for such produce. The economic feasibility of dried and organic plum production was calculated on the basis of a single production cycle according to the type of costs, i.e. inputs, outputs and selling prices.

RESULTS AND DISCUSSION

Value chain

A value chain is an affirmative technique of strategic management (Kaličanin, 2005). Its basic purpose is the analysis of resources and the ability to create value for consumers, creating a competitive advantage on the market. It is also a powerful tool for increasing the added value of products. A value chain represents a synthesis of activities carried out by a business organization in order to produce, pack, design, market, deliver and support its products. Several relevant activities can be identified in the value chain of agricultural products (Sredojević Zorica, 2014). These activities are grouped into the primary ones such as incorporating inputs into production (input logistics), converting inputs into final products (production), transporting and shipping of final products (exit logistics), marketing and sales, services and others supporting activities (such as technology development, human resource management, infrastructure of the organization, etc.). Each activity creates a cost and a link with other activities. The activity chain also includes business profit, i.e. the amount which customers are willing to pay exceeding the costs of running the activities.

A value chain is a set of related activities (primary and auxiliary) adding value to products or services, and the supply is linked with the demand side (Plazibat et al., 2016). Therefore, creating a profitable value chain requires the reconciliation between the wishes of the customers, or the supply chain, and what is created in the supply chain. In order to maximize supply chains, it is necessary to harmonize the flow of supplies with the flow of value from consumers, due to rapid changes in their tastes, desires and demands. For these reasons, the supply chain and value chain should not be observed as separate processes, but as an integrated entity (Perkov and Čosić Draženko, 2012).

A value chain consists of all the members of a supply chain, which are involved in the process of creating the value and

delivery of products to final customers. The market should be characterized by good and quality relationships within the supply channel, which will result in adding value to the final customer. It is a source of competitive advantage on the market (Plazibat et al., 2016). Members of value chains, in order to strengthen their competitiveness, create closer relationships by entering into partnerships, or creating strategic alliances, in which they do not lose their autonomy.

The investment value of the plant for drying fruit

The primary production of fruits intended for drying includes the selection of assortments, cultural practices, time and methods of harvesting, which implies a planned planting of fruit for obtaining quality raw material for drying (Lozano, 2006). All fruit species can be dried, but do not yield quality products, or as dried have a lower possibility of placement. Plums, grapes, apricots and figs are traditionally suitable for drying.

Plum drying can be natural, controlled or combined (Grabowski et al., 2005). In accordance with the latest trends, solar and wind energy systems are increasingly used in many existing conventional drying systems to provide part or all the energy needed for the process of plum drying.

Energy consumption and quality of the dried product are important parameters for determining the type of drying. Convective drying is the most widespread method of drying fruits (especially plums) both in Serbia and the world, and it is most commonly applied at present (Mitrović Olga, 2012). This is the most popular method of conserving because it is cheap and easy to use.

Investments in the construction of small and medium-sized plants for drying fruits on family farms can be very different. According to Milić et al. (2017), a total investment in the construction of a fruit drying plant amounts to 27,900 € (plant, equipment, cold storages (20 m²), boiler rooms, construction facilities (30 m²) and infrastructure).

Among dried plum producers in Serbia, dryers with a capacity of 350 kg of dried plums per day are widespread. In one cycle, two wagons with a total of 1,400 kg of fresh plums can be placed in a dryer. Dryer contains a chamber with indirect water heating. The costs of building the facility and dryers are about 15,000 € (Rajić et al., 2005). The plant should be operational for 100 days in order to cover the costs with a profit of 50 cents per kg of dried plum.

According to Živković et al. (2006), the costs of the construction of a drying capacity of 1,000 kg of dry plums per charge are 6.400 - 13.900 € according to Scenario A, 7.600 - 15.100 € according to Scenario B, and 8.600 - 16.100 € according to Scenario C, depending on the facility construction, the price and quality of the equipment, financing methods, etc.

Possibilities of creating added value for products

Processing

Using the combined technology of fruit drying and the equipment constructed at the Faculty of Agriculture in Novi Sad, the following fruit species can be dried: apricots, peaches, nectarines, vineyard peaches, pears, apples, quinces, plums and cherries. The equipment can also be used for the conventional drying (without osmotic pre-treatment) of the following fruit crops: cherries, plums, apple leaves (chips), berries and seedless grapes. In addition to fruit, various types of vegetables, medicinal herbs, forest fruits and etc. can be dried in a wood convective dryer (Babić et al., 2003).

The calculation of the dried plum production costs was done based on a drying capacity of 450 kg of fresh plums per day. The plum drying period was 40 days with a total of 18,000 kg of fresh plums (Lukač Bulatović Mirjana et al., 2017).

In the production of dried plum with stone, with an average production of 112 kg/day and an average selling price of 350 RSD/kg, the value of production was 39,200 RSD per day (Table 1). When the variable costs were deducted from the production value (18,100.8 RSD/day), the contribution margin was 21,099.2 RSD/day. The realized profit calculated as the difference between the production value and the total costs was 18,236.8 RSD/day (for 24 hours of drying).

Table 1. The cost calculation of dried plum production by cost types

COSTS	Units	Amount	Price (RSD)	Total		Structure (%)
				RSD/for 1 day	RSD/kg	
1. Fresh plums	kg	450	15	6,750	60.3	32.2
2. Sugar	kg	7.6	60	456	4.1	2.2
3. Water	l	1000	0.113	113	1.0	0.5
4. Packaging and other costs				2860	25.5	13.6
I Material costs (1-4)				10,179	90.9	48.5
5. Electrical energy	kwh	61.6	8.12	500.2	4.5	2.4
6. Heat energy (straw)	kg	168	3.7	621.6	5.6	3.0
7. Labour costs	h	40	170	6800	60.7	32.4
A) VARIABLE COSTS (1-7)				18,100.8	161.7	86.3
8. Equipment and facility depreciation				2,242.4	20.0	10.7
9. Overhead costs				620	5.6	3.0
B) TOTAL COSTS (1-9)				20,963.2	187.3	100.0
ACHIEVED RESULTS	Unit	Amount	Price (RSD)	Total		Cost price (RSD/kg)
				RSD/for 1 day	RSD/kg	
10. Dried plums	kg	112	350	39,200	350	187.3
C) PRODUCTION VALUE (10)				39,200	350	
D) CONTRIBUTION MARGIN (C-A)				21,099.2	188	
E) PROFIT (C-B)				18,236.8	163	

Source: Authors' calculation

However, it should be noted that the purchase price of plums is very unstable, even very low in some years, which significantly reduces the realized economic effects of this production.

With an average drying ratio of 4:1 (100 kg of fresh plums yield 25 kg of dried plums with a moisture content of 26 %), the added value of dried plums is increased approximately 6 times compared to fresh plums.

Organic production

Organic production represents a system of the ecological management of production, processing, packaging, storing, transporting, labelling, marketing and controlling organically produced food in accordance with the international standards, in particular the EU regulations, IFOAM (International Federation for Organic Agriculture) and national regulations (Vukoje et al., 2015).

Despite lower yields in the organic production of plums and increased labour force requirements, this production can have favourable economic effects due to a higher selling price of organic plums (higher by 40 to 80 %). Even though organically produced plums can be economically more profitable, such products are also more environmentally friendly. In the value chain of organic products, the highest added value and the greatest economic benefit are achieved in the processing of organic products. In addition to the basic raw material (fresh fruits) costs, a significant share in the structure of processing

costs is claimed by other costs, the structure and amount of which depend on the type of processing.

According to the economic indicators calculated, it can be concluded that a positive financial result (profit) of 3.940 €/ha is achieved in the organic production of plums (Sredojević Zorica et al., 2017). The cost price of plum production was 0.16 €/kg and the selling price was 0.38 €/kg. As the organic production of plums generates profit and the cost price per unit of measure is significantly lower than the purchase price of plums (0.16 €/kg < 0.38 €/kg), the organic production of plums is economically justified for the producer.

Packaging

With regard to processed products, special attention is paid to packaging and design for their value-adding features (especially smaller packages such as 100 and 200 g). Plums without stone can be packed in different packages, primarily in bags from 200 to 500 g and carton boxes of 1, 5, 10 and 12.5 kg. However, significant quantities of organic and processed products in Serbia are still sold in larger packages and in bulk, which is economically unfavourable as the commercial value of such products is reduced (Sredojević Zorica, 2014; Sredojević Zorica and Simić Ivana, 2016).

Branding

A product brand is the name, number, mark, stamp and design (or a combination of these) by which the producer "stamps" the product and declares itself as its creator in order to differentiate its product in relation to the same or similar products of other producers (Sredojević Zorica i Simić Ivana, 2016). The brand basically represents

the integration of all the data on a product or groups of products to enhance the credibility and reputation of an individual or organization. The brand is one of the most important items contributing to creating a product image in the minds of the producers. The image of a product is more important than the physical characteristics of the product with regard to sales. Through the brand, the producer identifies himself as the maker of the product, so that other manufacturers, by producing the same products, would not be able to harvest the profit of the brand's reputation. Consequently, the manufacturer acquires control over the market, freely pursues a price policy, more easily conducts promotional activities and builds its reputation. Branding is a practical pre-sale phase of a product or service, and simply contributes to more efficient sales.

Brand building refers to selecting the brand name and the manner in which it will be developed and positioned on the market (Sredojević Zorica et al., 2017). A good brand name entails the following: it is easy to remember and pronounce, it associates with positive elements, it points to the benefits of the product, it differs from others, and it does not violate the rules of the existing registered brand names. The success of the brand most significantly depends on what potential consumers and customers think about it. The stamp represents a protected product or service mark, which is an integral part of the brand concept, and is a legal remedy protecting the brand owner in the situation of unauthorized use. The brand is a set of visual, emotional, rational and cultural characteristics that the customer associates with the organization and product for which the brand

is related. It includes the name, trade name, logo or symbol of a product and/or business organization. It differentiates one manufacturer from all others on the market. The designation of the geographical origin of the product is used to mark the natural, agricultural, food and industrial products of domestic origin. The name of the origin is the geographical name of the country, region, or locality, the quality and particular properties of which are exclusively or substantially conditioned by the geographical environment, including natural and human factors.

CONCLUSIONS

In the production of dried plum with stone, with an average production of 112 kg/day and an average selling price of 350 RSD/kg, the production value was 39.200 RSD per day. When the variable costs were deducted from the production value (18,100.8 RSD/day), the contribution margin amounted to 21,099.2 RSD/day. The realized profit calculated as the difference between the production value and the total costs was 18,236.8din/day (for 24 hours of drying). With an average drying ratio of 4:1 (100 kg of fresh plums yield 25 kg of dried plums with a moisture content of 26 %), the added value of dried plums is increased approximately 6 times compared to fresh plums.

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In addition to producers and processors, distributors, brokers, shops and markets play an important role in the value chain.

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