

A COMPARATIVE ECONOMIC ANALYSIS OF THE DIFFERENT VARIETIES IN INTEGRATED APPLE PRODUCTION

KOMPARATIVNA EKONOMSKA ANALIZA RAZLIČITIH SORTI U INTEGRALNOJ PROIZVODNJI JABUKE

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ABSTRACT

Given that the choice of varieties depends significantly on the extent and quality of production, the paper made a comparative economic analysis of yield, production costs and the cost of four apple varieties (Gala, Braeburn and Golden Delicious Granny Smith) in integrated production. On average for the period 2008-2013 in the production of the analyzed apple cultivars largest financial result (profit) was recorded in the variety Braeburn (1,166,980 RSD/ha). In the production of varieties Braeburn highest average yield (54,071 RSD/ha) and relatively low production costs (1,049,931 RSD/ha) were positively influenced the achievement of a satisfactory profit. The cultivar Braeburn financial result was almost doubles that of the variety Granny Smith. At the same time the cultivar Braeburn was detected and the lowest cost (20.24 \$ /kg). In the analyzed production of varieties Gala total costs of production amounted to 1,009,787 L/ha. Labor costs in the amount of 392,360 d / ha takes a share of 38.85 % in the total cost. According to the representation in the total costs then comes cost of materials (23.13 %). The calculated cost is an average of 20.23 L/kg, with a variation of the observed age of 14.10 L/kg in 2011 to 34.43 kg/ha in the 2008th year.

Key words: economic analysis, apple variety, integrated production, cost.

REZIME

S obzirom da od izbora sorte značajno zavisi obim i kvalitet proizvodnje, u radu je sačinjena komparativna ekonomska analiza prinosa, troškova proizvodnje i cene koštanja za četiri sorti jabuke (Gala, Breburn Zlatni delišes i Greni smit) u integralnoj proizvodnji. U proseku za period 2008-2013. godine u proizvodnji analiziranih sorti jabuke, najveći finansijski rezultat (profit) je ostvaren kod sorte Breburn (1.166.980 RSD/ha). U proizvodnji jabuke sorte Breburn najveći prosečan prinos (54.071 kg/ha) i relativno niski troškovi proizvodnje (1.049.931 RSD/ha) su pozitivno uticali na postizanje zadovoljavajućeg profita. Kod sorte Breburn ostvareni finansijski rezultat je skoro dvostruko veći u odnosu na sortu Greni Smit. Istovremeno kod sorte Breburn je konstatovana i najniža cena koštanja (20,24 RSD/kg). U analiziranoj proizvodnji sorte Gala ukupni troškovi proizvodnje su iznosili 1.009.787 RSD/ha. Troškovi rada sa iznosom od 392.360 RSD/ha zauzimaju učešće od 38,85 % u strukturi ukupnih troškova. Po zastupljenosti u ukupnim troškovima, zatim, dolaze troškovi materijala (23,13 %). Izračunata cena koštanja iznosi u proseku 20,23 RSD/kg, sa variranjima po posmatranim godinama od 14,10 RSD/kg u 2011. godini do 34,43 kg/ha u 2008. godini.

Ključne reči: ekonomska analiza, sorta jabuke, integralna proizvodnja, cena koštanja.

INTRODUCTION

Apple is native to the northwestern regions of Asia and neighboring European areas. These regions of Asia and Europe are characterized by the greatest variety of forms of apples and their corresponding hereditary variability. Today, in almost all deciduous forests on moderate elevations (600-2000 m) in different climatic regions, particularly in the northern hemisphere, among other plants, and wild apples are in the form of population with many biotypes of various properties (Milić and Radojević, 2003). Apple is one of the most important fruit species in the world and the leading in Europe. Production and consumption of apples in relation to the total production and consumption is in third place, just behind the citrus and banana (Milić et al., 2005). It may be noted that the measure of development apple fruit production of each country, as the number of apple trees increases the intensity of fruit production in general and vice versa. On average for the period (2009-2013) apple production in the EU (28) stood at 10.5 million tons (www.wap-association.org). Poland is the leading producer with an average

production of 2.6 million tons, accounting for 24.76% of total volume of apple production in the EU. Then, followed by Italy (2.2 million tons), France (1.5 million tons) and Germany (927,000 t).

Modern apple breeding and intensive production in agriculture, in general are the result of technological advances and pursuit of profit. However, the desire for achieving greater economic benefits, both individuals and businesses and the lack of motivation for environmental protection are increasingly taking their toll. Striving for achieving the higher returns still lead to negative environmental consequences of large-scale. Economic thinking is to seek solutions and capabilities, both in the circumstances the best, most appropriate and economical way to use limited production resources, without having negative consequences of their use come to the fore in the least possible (Sredojević et al., 2005). Keeping in mind the latest trends in the environment and are increasingly demands for food production with less usage of synthetic chemical products, the more we talk about the concept of integrated production. This concept is based

on using a combination of genetic, agronomic, chemical and biotechnological methods in a commercially acceptable production system, which provides the biological quality of the fruit and the environment. Production of the concept of integrated production, in fact, represents a compromise between the demands of consumers for safe food and environmental protection objectives and manufacturers to economically sound and sustainable production (Milić et al., 2012).

MATERIAL AND METHOD

As the main source of data used as internal records, Costing, technology and online business plan successful long-time growers of apples in Vojvodina. In addition, as data sources were used and available statistical data on the production of apples in the EU (www.wap-association.org), and the publication of scientific and technical consulting. For four apple cultivars Gala, Braeburn, Golden Delicious and Granny Smith, an analysis of grain yields, production costs and the cost of the integral production in the period 2008-2013 year. We apply the calculative methods of determining the full cost, and then made a comparative analysis calculated economic indicators. Collected and systematized data, calculating procedures and established economic indicators are presented in tables.

RESULTS AND DISCUSSION

Production and economic analysis in production of apple

When selecting varieties of fruit should strive to Biological characteristics of fully correspond to the ecological conditions of the environment in which it now raises and that the fruits of the same variety to meet the demand of the market. Therefore, we can say that the selection of varieties is very important and complex issue to be resolved even before raising orchards. The long period of operation and a large number of varieties of different economic - technological characteristics, more importantly, highlight the problem of properly solving the assortment of fruit. Mistakes made in the selection of varieties is difficult to remove later, and if they do have opportunities to amend the need to allocate significant financial resources. From represented varieties depends on the possibility of placing products on the domestic and international markets.

The creation and introduction into production of vital, gender and high-quality varieties of apples can significantly increase the volume of production and improve the quality of fruits. The world is more intense for breeding apples than any other fruit. As a result of spontaneous and planned hybridization occurred more than 10,000 varieties of precious apples. Varieties resistant to various pathogens greatly facilitate the application of the concept of integrated production of apples. Increasing attention is paid to the breeding of creating varieties with high fruit quality (Mišić, 2002).

Therefore, the selected varieties depend significantly on the production, use and market value of the fruit, and its profits, purpose and implementation of the product in the market. On average for the period (2009-2013), the most common varieties of apples in the EU (28) are a Golden Delicious. This variety, with an average production of about 2.5 million tons occupies a share of 23.78 % in the assortment of apples European Union. Against actual production volume, then are following varieties Gala, I dared, Red Delicious and Jon gold.

Table 1. Economic indicators analyzed apple varieties in the period 2008-2013 (Planting density 3.2 x 0.80 m)

Ord. num.	Economic indicator	Unit of measurement	Apple Variety*			
			I	II	III	IV
1.	Period of cultivation	year	2	2	2	2
2.	Period of exploitation	year	20	20	20	20
3.	Average yield	kg/ha	49913	54071	48120	41517
4.	Market (selling) price of apples	RSD/kg	41	41	41	41
5.	Average value of production (3. x 4.)	RSD/ha	2046433	2216911	1972920	1702197
6.	Average cost of production	RSD/ha	1009787	1049931	1107350	1081598
7.	Average financial result (5.-6.)	RSD/ha	948646	1166980	865570	620599
8.	Cost price of apples (6. /3.)	RSD/kg	20.23**	20.04**	24.88***	27.16***

*Gala (I), Braeburn (II), Golden Delicious (III), Granny Smith (IV)

**Six annually average

***Seven annually average

Apple tree or plant in operation is giving the uneven yields. If the factors that regulate fertility are in harmony with, the yields from year to year until they reach the maximum. This is the so-called period of increasing yields or increasing cropping period. After him, there is a period of full-yielding, and this is the longest period during the planting operation. Towards the end of the lifetime of plantation yields begin to decline sharply, with the yield reduction stands out period or a period of declining fertility.

On average for the period 2008-2013 was the yield in the production of the analyzed apple cultivars ranged from 41,517 kg/ha variety Granny Smith to 54,071 kg/ha in variety Braeburn (Table 1). At Braeburn varieties, in which the highest average yield was observed, despite the variation in the observed years, yield increases from 17,176 kg/ha in the 2008th year to 92 461 kg/ha in the 2013th year.

Economic indicators in the production of apples

Production value is the market value of the resulting products and services during a fiscal year. The production is economically justified if the total cost is less than the total benefits achieved in a production. Thus, the realized value of production is the product of the realized returns and the selling price, but it must not be forgotten that there is another summand, which is in the literature as "other", while in developed countries this term include incentives and benefits of the state, and incentives for production.

On average for the period studied (2008-2013) realized the value of production of the analyzed apple cultivars ranged from 1,702,197 RSD/ha in variety Granny Smith to 2,216,911 RSD/ha in variety Braeburn (Table 1). Thus, at the same retail price, the highest production was achieved in the production of varieties Braeburn which has achieved the largest average yield.

The cost of production in a broader sense, to the value of the means of production consumed in order to produce new products or achieve new performance evaluation in a given time period. From this conceptual definition, it is clear that the emphasis on the types of costs (Sredojević, 2011). In terms of competition, the goal of every manufacturer is to offer not only a

greater quantity, but also the costs to be as low as possible and average for the period 2008-2013. The production costs are fairly equal in production analyzed varieties of apples with a variation of 1,009,787 RSD/ha in variety Gala to 1,107,350 RSD/ha in variety Golden Delicious (Table 1). Low cost was recorded in the variety Braeburn (20.24 RSD/kg), and the highest in the variety Granny Smith (27.16 RSD/kg). The success of economic activity depends on the farm, on the one hand, the value of farm production that is realized and, on the other hand, the costs incurred in connection with the production and the sale, i.e. implementations (Marko et al., 1998). When the output value exceeds the amount of actual expenses, then realized a positive financial result (profit). Conversely, when the cost over the value of production, operation is achieved financial negative result (loss). Financial result depends both on the cost of the product, as well as the socially recognized the value of production in the market.

On average for the period 2008-2013, the financial result in the production of the analyzed apple cultivars ranged from 620,599 RSD/ha in variety Granny Smith to 1,166,980 RSD/ha in variety Braeburn. In the production of varieties Braeburn financial result (profit) is almost twice as higher than the Granny Smith variety.

More detailed analysis of the cost of production is carried out only for the variety Gala (Table 2). On average for the period 2008-2013 year, in the analyzed apple production, total production costs amounted to 1,009,787 RSD/ha.

Table 2. Cost of production of varieties Gala in the period 2008-2013

Yield and elements of costs	Average 2008-2013	Share (%)
B. Yield (kg/ha)	49,913	/
1. Cost of materials (RSD/ha)	233,555	23.13
Fertilizer (RSD/ha)	54,245	5.37
Pesticides (RSD/ha)	173,543	17.19
Other material (RSD/ha)	5,767	0.57
2. Machinery (RSD/ha)	147,880	14.64
3. Gross wages (RSD/ha)	392,360	38.86
Permanent workers	181,543	17.98
Seasonal workers	176,808	17.51
Guarding	34,009	3.37
4. Amortization (RSD/ha)	150,855	14.94
5. General costs (RSD/ha)	85,139	8.43
6. Costs per ha (RSD/ha) (1.-5.)	1,009.789	100.00
7. Cost price (RSD/kg) (6./B)	20,23	└

Cost of labor in the amount of 392,360 RSD/ha take a share of 38.85% in the total cost. According to the representation, the total cost, then comes the cost of materials (23.13%). The calculated cost is an average of 20.23 RSD/kg, with a variation of the observed age of 14.10 RSD/kg in 2011 to 34.43 RSD/ha in 2008 year.

CONCLUSION

For the study orchard apples are represented best varieties of apples: Gala, Braeburn, Red Delicious, Granny Smith, Golden Delicious, organic apple Goldraš (Goldrush). The orchard is based according to the latest technological requirements. The total plantation area was covered by a network of anti-hail protection system for protection from frost. Station orchard monitor weather conditions and flight microspore phytopathogens, which is very important for optimal protection apples. Watering and feeding orchard performs system "drop by drop". For now it's

covered with GPRS systems and the control parameters and performs the computer. In research company in the future plans rounding apple orchard at 600 ha. In addition built and ULO storage capacity of 6,000 t for apples.

On average for the period 2008-2013 in the production of the analyzed apple cultivars largest financial result (profit) was recorded in the variety Braeburn (1,166,980 RSD/ha). In the production of varieties Braeburn highest average yield (54,071 kg/ha) and relatively low production costs (1,049,931 RSD/ha) were positively influenced the achievement of profit. The cultivar Braeburn financial result was almost doubles that of the variety Granny Smith. At the same time the cultivar Braeburn has reached the lowest cost (20.24 RSD/kg).

On average for the period 2008-2013 in the analyzed production of varieties Gala, the total cost of production amounted to 1,009,787 RSD/ha. Cost of labor in the amount of 392,360 RSD/ha take a share of 38.85% in the total cost. Per share, the total cost, then comes the cost of materials (23.13%). The calculated cost is an average of 20.23 RSD/kg, with a variation of the observed age of 14.10 RSD/kg in 2011 to 34.43 kg/ha in the 2008th year.

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