

ECONOMIC AND AGRONOMIC ANALYSIS OF ORGANIC PRODUCTION OF TOMATO AND PEPPER

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Abstract

In Serbia, the vegetable crops are grown on about 284,000 ha which represents 9% of the total arable land. Tomato and pepper represent 8% of total vegetable production. Both species are of interest to fresh consumption and processing. One of the possibilities for increasing the value of production of the mentioned plant species per area unit is organic production with mandatory certification. Certified production is carried out with higher expenses, but the price of products is doubled comparing to the inorganic products. This paper analyzes the cost of production of tomato and pepper produced following the principles of organic vegetable production. Analytical calculation showed gain in tomato production in amount of 6210€/ha, with the return rate 41.4% and coefficient of cost-effectiveness 1.71. Pepper production has achieved a profit of 6,110 €/ha, with the return rate 43.33% and 1.76 coefficient of cost-effectiveness. Values of the above parameters indicate high economy of both analysed products.

Key words: *analytical calculation, economy production, tomato, pepper*

Introduction

Vegetable production represents one of the most intensive branch of plant production, which is reflected in high yields, realized gain, income. Vegetable crops have diverse species and production methods. Having in mind the capacity and the needs, the vegetable production in Serbia is still insufficient. Vegetable can take an important place in export of agricultural products. This is especially repeated to the products from certified organic production (Klonsky et al. 1994, Manivong et al. 2009). Serbia has favourable

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agro-ecological conditions for growing most of the vegetable species and the advantage of proximity of European market. Vegetable makes 9% of total planted area in Serbia, 11,31% of total production and 9% of total export of agricultural products (www.stat.gov.rs). There are 30 vegetable species intensively grown and used in Serbia today and it would be possible to use 150 (Markovic et al. 2007). The main economical characteristic of this kind of production is rapid turnover of capital which makes it very interesting for small producers, which still make the base of agricultural production in Serbia.

This paper aims to show the economy of certified organic production of tomato and pepper in the open field in the Republic of Serbia.

Methodology

The database used for this research, was the record book of the Institute of Vegetable Crops, Smederevska Palanka (accounting calculations), as well as records of costs and yields achieved in the production of tomato and pepper in 2010 at the experimental field of the Institute. Retail prices have been determined by the method of interviews sellers in Belgrade and Novi Sad, who sell certified organic products.

The economic analysis has been performed using a calculation method for the purpose of determining the cost and calculating basic indicators of the profitability of production for the analyzed vegetable species.

Results and discussion

The main feature of the development of vegetable production is the realization of economic yield, high nutritional and health quality of vegetables, which is achieved by applying suitable agro-technical measures, growing highly productive and resistant varieties, using good quality seeds.

According to the sowing structure of vegetable in our country it can be concluded that pepper and tomato belong to the group of the most popular vegetable. These are vegetable species that need intensive care and high investments during the production process. On the other hand, investments can be returned through high and quality yield. In our case, total yield of tomato was 25 t/ha and pepper 23,5 t/ha (Table 1.). Analysis of production for both vegetable species, which botanically belong to the same family, shows that their structure and the height of expenses during the production is very similar (Table 1.). Based on those values we calculated cost price per product unit for tomato and pepper 0,36 and 0,34 €/kg. These prices, with the mentioned yield, cover the production expenses. The expenses of the production are beside the income, one of the most important factors impacting the gain and the production. With the development of market economy they represent the important factor of competition (Bošnjak i Rodić, 2010). Record keeping required records of all costs of labor, and materials (inputs) consumed in the production. Just for the successful management of production, managers must always know the amount of costs, as well as their structure and dynamics (Kay et al. 2008). The analysis of individual costs (Table 1), shows that in both production processes (pepper and tomato), the largest acquisition costs are for

high quality planting material (Graf. 1.), which is the main condition for the safe and stable production. This cost can be reduced if the manufacturer decides to produce its own nursery. However, in this case the risk is much higher. One of the important items, looking at the amount of costs is the expenditure of labor force (Table 1, Graf. 1).

Knowledge of certain costs and their share in the overall structure of production is important for business decision making, when the economic analysis of production indicates the dominant group costs, which largely affect the cost structure of the finished product (Kanisek i sar. 2008.). It is known that production costs are not statistical categories. They vary, depending on the quality of used inputs and their prices. When planning future production, the structure of costs and revenues, as well as an absolute measure of performance, should be used to calculate the relative measure of the success of pepper and tomato production (profitability). Coefficient of cost-effectiveness is an expression of rational use of resources and in our case for tomato it is 1.71 and for pepper it is 1.76. The calculated values indicate that both the production cost.

Profitability of production is the effect of total investment in the production of tomato and pepper. Calculated coefficient is slightly higher for pepper 43.33%, while the tomato it is 41.4% (Table 3).

For the purpose of organizing and promoting the production of tomatoes and peppers, it is necessary to analyze those results that are a result of costs incurred. Economic analysis of the results achieved point to contribute to production volume and sales prices realized values of production. It establishes different relationships as indicators of quality investment (efficiency). The observed production of tomatoes in the realized yield of 25000kg/ha and sale price of 0.6 € / kg achieved a production value of € 15,000 (Table 2). The level of cost is € 8,790 / ha, and the realized profit € 6,210 / ha. The average production of pepper of 23,500 kg / ha and the sale price of 0.6 € / kg achieved a production value of € 14,100 (Table 2). The costs incurred during production are € 7,990 / ha, achieved profit is € 6,110 / ha. For the planned sale price of tomato of 0.6 € / kg, the profitability can be achieved when the yield is 14,650 kg/ha. That amount is 10.350 kg less than the actual yield. When the planned sale price of pepper 0.6 € / kg yield should be 13,317 kg / ha. For planned output of 23.500kg/ha, this value is 10.183kg lower. These data show that the realized yield indicates that the production of tomatoes and peppers in the open field, according to the principles of organic vegetable production is economical.

Conclusion

Tomato and pepper belong to the group of intensive vegetable crops and their production must be carefully economically analyzed and planned. Analytical calculation can be used as methodological base of the analysis. The calculated relative parameters of successful production of tomato are: coefficient of cost-effectiveness 1,71, rate of return 39.4%, an absolute indicator-profit with a value of €6,210/ha. In pepper production coefficient of cost-effectiveness is 1.76, the rate of return 44.7% and the realized profit is € 6,110 / ha. Achieved indicators are a result of growing pepper and tomato on the concept of organic cultivation technology in economic and market conditions in Serbia.

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Table 1: Cost of certified organic tomato and pepper production per unit area (euro / ha)

Costs:	tomato	pepper
	Per ha	Per ha
destruction of plant residues	10	10
manure	280	280
removing manure	30	30
basic processing	100	100
seed*	0	0
nursery*	4.000	5000
additional processing	50	50
pre-sowing preparation	40	40
trellises, foil	2000	0
foliar fertilizers*	30	30
spraying*	20	20
cultivation*	60	60
irrigation	120	120
irrigation system	800	800
labour*	800	1000
chemical protection*	100	100
allowed chemicals	150	150
certification	200	200
Total:	8790	7990

Table 2: Realized yield per unit area (kg / ha), the price per unit (EUR / kg), the value of production (Euro / ha).

	tomato	pepper
yield (kg / ha)	25000	23500
Price (eur/kg-piece)	0,6	0,6
Production value (EUR)	15000	14100

Table 3: Indicators of economy of production of tomato and pepper according to the principles of organic vegetable production

	tomato	pepper
Total cost (eur/ha)	8790	7990
Value of production (eur/ha)	15000	14100
Cost price (eur/kg)	0,36	0,34
gain(eur/ ha)	6210	6110
border of profitability (kg, pieces / ha)	14650	13317
business rate of profitability (gain on 100€)	41,4	43,33
coefficient of cost-effectiveness (e)	1,71	1,76

Graf 1. Partial costs of certified organic tomato and pepper production (%)

