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## ECONOMIC JUSTIFICATION FOR VEGETABLE SEED CONCEPT OF SUSTAINABLE ORGANIC PRODUCTION

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### Abstract

*According to the Office for Statistics of the Republic of Serbia, vegetable production takes place on around 284 000 ha. Only 490 hectares of this area is under organic production. This area is absolutely insufficient in comparison with EU countries and neighboring countries. One of the reasons for this low percentage of organic food in our country can be a lack of appropriate, certified, organic seed. The task of seed companies is finding out a solution that will allow sufficient market supply with organic seed and planting material, as soon as possible. This paper analyses the economics of beans, green beans, radish, small radish, lettuce and beetroot seed production, produced according to principles of organic vegetable production. Based on indicators of analytical calculations, it was established that the biggest profit is made in the production of beetroot seed, and the lowest in bean and green bean seed cultivars. All analyzed seed production was economically.*

**Key words:** *organic production, organic seeds, vegetables, economy*

### Introduction

Following the latest development trends in crop farming, we can say that the organic concept of growing plants is rising throughout the world and in our country. Recently we have witnessed increasing pressure of farmers on seed companies through demand for organically produced and certified seed. Since markets and restaurants, which offer the product of plants grown through the concept of organic farming have appeared, the pressure became higher. The vegetable seeds from the concept of organic production methods is very scarce in the domestic market. For these reasons,

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the vegetable seed companies, try to re-orient its conventional production towards the concept of organic seed production. Respecting the specificity carried from concept of vegetable organic seed production and standards that must be realized, the seed companies are faced with many difficulties. In addition, the diversity of varieties they could offer to farmers is very poor. Considering the limiting factors such as: soil, weather conditions, weeds and diseases, seed companies resort to the production of varieties that have some degree of resistance to them (Bonino and Cantliffe, 2009). Due the same reasons the seed companies avoid the production of hybrid seeds and some new highly productive cultivars that require intensive use of conventional funds for its cultivation. That is why we could often hear complaints of farmers how they can't find favorite varieties or hybrids in offer of organic certified seed. Seed companies and particularly those that produce vegetable seeds which in product range have a very large number of divergent plant species, are in great doubt regarding the extent and economic justify of the concept of production of organic certified seed. The aim of this paper is to show exactly the production of certified organic seed: bean, green bean, radish, small radish, lettuce and beetroot at the Institute of Vegetable Crops, Smederevska Palanka and its economic justification.

Justification for future agricultural production should be found in higher and higher prices and income that can be achieved by the concept of organic production, which is indicated by cost benefit ratio (Adhikari, 2009).

### **Methodology**

As data in this study, we used the accounting records of the Institute for Vegetable Crops, Smederevska Palanka (Costing), as well as records of costs and yields achieved in the production of beans, green beans, radish, small radish, lettuce and beetroot in the experimental field of institute in 2010. In order to determinate the sale prices of vegetable seed, the price list of the Institute for Vegetable Crops has been used. The economic analysis was performed using the method of calculation for determining cost and calculating the basic indicators of profitability of seed production of analyzed vegetable crops.

### **Results and discussion**

For each plant production and particularly for the concept of organic vegetable seed production, it is necessary to know the technology of growing, which, in this case, is not easy at all, and to know the economic parameters that determine justification of certain organic seed production. Improving and position of production is largely defined by economic effect that it achieves (Brodt et al., 2006). Achieved economic effect is a limiting factor in making decisions to start the seed production in the seed company or by the farmers.

Our paper analyzed the seed production of divergent types of vegetables, which in concept production organic requires high investments. However, the invested funds are returned through the achieved yield and its market price. In table 2, we can see seed yields for beans, green beans, radish, small radish, lettuce and beetroot. Yield per hectare (1 ha) was ranged from 140 kg for the radish and small radish to 650 kg for beans and green beans. If we make an analysis of production for the mentioned plant species, we will notice that some species have identical cost structure (beans / green beans and radish / small radish) that occur during seed production. Also, in the botanical sense

this plant species belong to the same families. The calculated cost per unit for the beans / green beans is 21 €/kg, radish / small radishes 90 €/kg, lettuce 86 €/kg and beetroot 75 €/kg. These prices cover production costs in our study which achieved yields. The costs of elements of production directly affect the profits and profitability (Muncan and Zivkovic, 2004). Successful management of production means that managers need to know, at any time, the amount, structure and dynamics of costs (Kay et al., 2008). Analysis of individual costs incurred during our seed production (Table 1), shows that in most production, the largest costs, besides the cost of procurement of seed are the labor costs. This cost can not be to decreased the concept of organic farming means a reduced use of pesticides which results in increase of human labor. Labor costs, depending on the type of production, participate for 13.59% in the total cost of produce of seed beans and green beans, and 16.02% of the lettuce (Table 1). In the concept of organic seed production, increased production costs is compensate by higher prices of organically produced seed and up to 5 times compared to conventional production (Labrada, 2004; Zeijden, 2004).

*Table 1. Cost of certified organic seed production of beans, green beans, radish, small radish, lettuce and beetroot per unit area (€/ha).*

<b>costs:</b>	beetroot	radish small radish	beans, green beans	lettuce
destruction of previous crop residues	10	10	10	10
manure	280	280	0	280
removal of manure	30	30	0	30
mineral fertilizers and other fertilizers	500	500	30	500
fertilization	20	20	0	20
basic processing - plowing	100	100	100	100
seed	700	400	2160	40
additional processing	50	50	50	50
preparation for sowing	40	40	40	40
sowing	40	40	40	40
foliar fertilizer	30	30	30	30
spraying	20	20	20	20
inter-row cultivation	60	60	90	60
irrigation	300	200	200	200
seasonal labor	650	550	700	500
chemical control of pests and diseases	40	40	100	0
allowed chemical preparations	60	150	150	0
harvest - phase I	150	150	150	150
harvest - phase II	150	120	180	150
application of seed crops	250	250	250	250
control of seeds	150	150	150	150
seed finishing	350	150	400	200
certification	300	300	300	300
<b>total costs:</b>	<b>4280</b>	<b>3640</b>	<b>5150</b>	<b>3120</b>

*Table 2. Yields per hectare (kg/ha), the unit price (€/kg), the value of production (€/ha).*

	beatroot	radish, small radish	bean, green bean	lettuce
Yield (kg/ha)	285	140	650	180
price (€/kg)	75	90	21	86
production value (€/ha)	21375	12600	13650	15480

Production efficiency comes from the rational use of all productive resources and in our seed production was ranged from 2.65 for beans to 4.99 for beatroot. Calculated values indicate that all productions were economically justified. Profitability is output of total investment in seed production of beans and green beans, radish and small radish, lettuce and beetroot. The profitability coefficient is the lowest in seed-production of beans and green beans (62.27%), and the highest in the seed-production of beetroot (79.98%) (Table 3).

*Table 3. Indicators of economic production of beans, green beans, radish, small radish, lettuce and beetroot on the principles of organic vegetable production.*

	beatroot	radish, small radish	beans, green beans	lettuce
costs (€/ha)	4280	3640	5150	3120
income (€/ha)	21375	12600	13650	15480
price of expense (€/kg)	15,02	26	7,92	17,33
profit (€/ha)	17095	8960	8500	12360
threshold of profitability (kg, pieces / ha)	57,07	40,44	245,24	36,28
rate of profitability (profit of 100 €)	79,98	71,11	62,27	79,84
coefficient of efficiency	4,99	3,46	2,65	4,96

An economic analysis of the results indicates the influence of production volume and sales prices on the total value of production. It establishes different relationships as indicators measuring the quality of committed investment (efficiency).

Due to relatively high prices of seed produced by the principles of organic vegetable production, despite the modest yields the a significant value of production has been achieved.

In the production of beetroot seeds the highest production value (€ 21,375), with the yield of 285 kg/ha and with the sale price of 75 €/kg (Table 2) has been achieved. In the production of seed radish and small radish the lowest production value (€ 12,600), with a yield of 140 kg/ha and the price of 90 €/kg seed has been achieved.

## Conclusion

Vegetable seed production based on the concept of organic production is very specific. It must be carefully planned and economically analysed to the detail. The expansion of organic agriculture is directly linked to the production of adequate seed. Calculated relative production indicators show that all the above production were economically justified. Most economical seed production is the production of beetroot seed. Economy coefficient was 4.99, the rate of profitability 79.98% and the absolute indicator-profit has a value of 17,095 €/ha. The least cost-effective production of seed cultivars with economy coefficient of 2.65, rate of profitability 62.27% , and profit of 8,500 €/ha, were seed-produce of bean and green bean. Expressed economic indicators were result of research in seed-production of beans, green beans, radish, radishes, lettuce, and beetroot in the concept of organic production tehnology in market conditions in Republic of Serbia.

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