Some economic indicators of the organic plant production

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Abstract

In this paper authors analyze certain economic indicators of the organic plant production. Economic indicators of organic production can be observed at the macroeconomic level, which includes determinants such as: socio-economic conditions for engaging in this business, agricultural policy of the state (especially its willingness to support this production), financing conditions (possibility of obtaining soft loans), state of the market (supply, demand and prices, export opportunities); level of organization (associations, cooperatives, clusters). At the microeconomic level, the determinants that can be distinguished are: the size and level of utilization of production factors, the structure of production, efficiency, productivity and profitability of production, the type of farm (crop production, livestock production, combined); regional specificity (lowland, highland farms), and so on. Using a comparative analysis of organic and conventional production authors come to a conclusion on the economic feasibility of organic plant production.

Key words: organic farming, conventional production, plant production, economic indicators, analysis.

Introduction

From an idealistic approach to production, life and the universe expressed in biodynamic production (Štajner, R. 1924), an organic production as a system was developed and it can be defined as a management of organic plant and livestock production while respecting environmental principles and standards, as well as specific local, agro-ecological conditions. In 1998 IFOAM pointed out that it is a way to develop stable, permanent and sustainable agroecosystems. (Lazic, B. 2008).

The main economic problems of organic agricultural production result from the two groups of factors: macroeconomic and microeconomic.

The macroeconomic determinants are: first of all socio-economic conditions for engaging in this business, then the state agricultural policy (especially willingness to support this production)¹, financing conditions (possibility of obtaining soft loans), state of the market (the supply, demand and prices, export opportunities); level of organization (association, cooperative, clusters).

From the microeconomic point of view successful development and economic strength of organic farms depends on many external and internal factors: the size and level of utilization of production factors, as well as the structure of production, efficiency, productivity and profitability, farm type (crop, livestock production, combined); regional specificity (lowland, highland farms), and so on.

Analysis of the economic performance of organic farming can be conducted based on surveys and studies taken in different countries. The goal is to reach the results and show the extent to which organic farming (plant production) is a viable alternative to conventional production, in terms of economic, financial, social and technical performance.

¹ Organic farming in the EU is subsidized more than in other parts of the world. These incentives are one of the main reasons for the relatively rapid development of organic production and the existence of a large number of organic farms in the EU. Regulation on the use of incentives to support the development of organic production in Serbia for 2011, allocated a total of 20 million, which represents 0.09% of 22 billion dinars, which is the agricultural budget for 2011 (www.minpolj.gov.rs).
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Economic performance of organic agriculture (and plant production) is measured through the physical and financial performance of these systems of production. The criteria used to evaluate the economic performance of organic farms depend on the goal that manufacturers have and the time horizon for which the analysis is conducted. The minimum requirement that should be set to the organic production is to be economically viable. This means that the return on invested funds must be sufficient to cover all expenses, including household consumption (Pejanović et al. 2011).

One of the fundamental issues of agro economic analysis is to define a farm model (Pejanović et al. 2009). For example, elements of the farm model with crop-livestock orientation of organic production are available arable land, buildings, machinery and equipment, labor, production line in cattle production and determined structural units, production lines in crop production, prices of inputs and outputs.

Economic input-output model parameters are transmitted to the appropriate mathematical simplex method. The procedure of optimizing precedes, namely, the formation of the initial simplex matrix, which contains initial solution based on the assumption that if all the available factors of production on the farm are not used enough, there is a loss in the amount of fixed costs, which are already made through the purchase of means of production, labor, and etc.

Analysis of the profitability of organic production farms (and plant production) involves testing and evaluating the financial performance of the final results achieved in the sphere of production and trade. Starting from such a conception, analysis of profitability is reduced to the level of profitability achieved in the total volume of sales. To be cost-effective (or profitable) means to operate (in the outcome of the entire business) in a way to achieve a surplus of revenues over expenses or a positive financial result. In contrast, unprofitable operations are ended with the negative financial results or losses.

In studying and monitoring the profitability an important issue is break-even point of profitability (Pejanović et al. 2009). This analysis is conducted to explain the relationship between the cost - income - results. Threshold of profitability (break-even point, or BE point) is the point at which the value of sales and total costs are equal. To calculate the break-even point farm managers need to know the price of products unit sold (P), variable cost per unit (VC) and total fixed costs (TFC)

\[
\text{BE} = \frac{\text{TFC}}{(P - VC)}
\]

Holding (company) has a positive break-even point when its total income is just enough to cover its total costs.

Break-even point of profitability is the point of intersection of the total income and expenses. That is the point in which a positive operation starts or ceases. It is such a combination of factors of production that allows the holding only the minimum requirement of existence.

The importance of the break-even point of profitability for the current sales is that it can influence the orientation of management regarding the return on assets and risk, and in the direction of reducing the cost of farm operations (the company).

Cost analysis means examining the dynamics and structure of the total cost of base and part of the cost-effectiveness analyzes. Cost analysis begins with an analysis of the total cost of reproduction, and goes to different parsing, which can be carried out in three directions: by type of costs, the place of cost, the cost carrier. There are also combined parsing as: types of costs by areas (e.g. operational accounting sheet); cost carriers by places (total product costs for each phase of production); types of charges by the carriers and locations (phase calculation of the product).

The purpose of cost analysis is to identify places and types of costs that can be reduced or avoided, and thus achieve better results in the following business period.

Analysis of the cost price examines the changes in the cost of production and detects capabilities to reduce costs. Therefore, the goal of analysis is its cost reduction. To achieve this it is necessary to analyze the causes of increase or decrease of costs.
Based on the analysis of costs and the price cost, a calculation of production can and should be made.

When it comes to organic production, cost analysis must take into account the costs of the application of appropriate agricultural practices.

One of the essential conditions for the economical organic plant production is the provision of nutrients in the soil. Because of the relatively cheap and efficient provision of necessary nutrients using fertilizers, application of organic fertilizers in intensive crop production in our country has been largely ignored. The use of nutrients in the manure was very modest, especially on large farms. The small number of livestock and modern housing conditions obtained very small quantities of manure. According to some estimates, instead of every four or five years, plots were fertilized with manure even every 18-20 years. In terms of organic production methods, if the fertilizer is manure, which is obtained at the farm, it is necessary to determine (Bogdanov et al. 2005):

- amounts of solid and liquid waste in animal production per head;
- the total annual amount of manure for all animals on the farm;
- the main content of nutrients in the total estimated amount of manure;
- the needs of individual crops to the major nutrient elements;
- settled crop needs for nutrients.

When applying fertilizer in terms of organic production methods, the attention goes on analysis of some problems, such as: cost of soil fertility control, fertilizer use and control of environmental factors on crop production, in order to achieve stable high yield, good quality, minimum investment of materials, energy and workforce - economic optimization and agrosystem protection, environmental protection and pollution of the biosphere.

To improve the effectiveness of organic production, due to biological, and agrotechnical organizational and economic reasons, it is significant to introduce the crop rotation (Pejanović et al. 2009). Planning, preparation and introduction of crop rotation requires knowledge of its inner structure and a good knowledge of crops, in order to maintain the humus in the soil and control pest outbreaks, weed and disease-causing agents. Today there are numerous practical observations and experimental results on the impact of crop yield on the next crop. An effective crop rotation offers many advantages of organizational-economic and ecological characteristics, which are of particular importance for the whole farm.

Market analysis includes identifying and measuring the factors that define the size of potential markets (domestic and foreign). The dimensions of the market can be thought of as the number of customers in certain areas and certain times for which a product is intended. The potential market is usually less than this number of customers and is defined by the number of potential customers who show some interest to give an organic product. Qualified market is one that has economic assumptions to buy a given product. It is important to determine the target (desired) participation as a percentage of potential and qualified markets.

Analysis of demand is an important analytical process that aims to identify and measure factors that affect or will affect the sales of the product.

Marketing cost analysis - it is a cost arising from the use of certain marketing activities. These costs include two categories of costs: costs of meeting demand and cost of creating demand.

To achieve the same economic result as in the conventional mode of production, the organic farmer should realize derived products by higher selling prices.

The lowest sale price of certain agricultural products, which can achieve the same amount of cover margins as in the conventional mode of production, can be calculated by the following equation (Sredojević, 2000):

\[
P_1c_1 - VT_1 = MP_1
\]

\[
P_2c_2 - VT_2 = MP_1
\]

\[
C_2 = P_1c_1 - (VT_1 - VT_2) / P_2
\]

that is:

\[
c_2 = (P_1c_1 - DVT) / P_2
\]
or simply expressed through the **margin of cover** price of the product in terms of alternative modes of production it can be obtained as follows:

\[ c_2 = \frac{(MP_1 - VT_2)}{P_2} \]

where:
- \( P_1 \) - the amount of product (yield) in terms of conventional methods of production;
- \( P_2 \) - the amount of product (yield) in terms of organic production methods;
- \( c_2 \) - the price of products in terms of conventional methods of production;
- \( VT_1 \) - external direct variable costs in terms of conventional methods of production;
- \( VT_2 \) - external direct variable costs in terms of organic production methods;
- \( MP_1 \) - cover margin requirements in conventional production methods.

**Gross margin** is one of the financial ratios that is now increasingly used in business analysis of agricultural holdings (Pejanović et al. 2009). It represents the output (production value) minus variable costs, specific to each production. Total gross margin for all lines of production on the farm is the amount by which all fixed costs are deducted in order to calculate the profit at the farm.

Gross margin shows how farmers gain or lose from the invested funds. At the same time, it demonstrates the economic strength of agricultural products on the market. Increased gross margin means less risky business. Agricultural holdings with higher gross margins may spend a larger amount of funds for variable costs than the competition. On the other hand, the agricultural farms with low gross margin per unit, which have relatively low margin but high volume production and sales, can be successful.

Gross margin gives, therefore, the basis for continual monitoring of operations, improving product competitiveness and improve profitability, in line production, and farms in general. Accordingly, gross margin is a good starting point for quality planning.

**Comparison of organic and conventional production systems**

Based on empirical research of physical and financial performance of organic farms, compared with the conventional production system, which are available in the literature (Lampkin and Padel, 1994), we can conclude that on the holdings in the organic system of production (Pejanović et al. 2011):

- The absolute yield levels increase over time, but at a lower rate compared to conventional systems. Thus, the absolute yields are generally lower, ranging in level of 10% -45% of conventional yields. Height yield compared to conventional systems depends on the type of farm, production intensity, the region where production takes place.
- Variable costs are lower, particularly agro-chemical substances, in the organic production system. There is a marked difference in the cost structure of organic and conventional systems. Organic farms are mostly labor intensive.
- Total production costs per unit are lower in the organic system compared to conventional, primarily due to lower use of chemicals.
- Premium prices for organic crops are widely available in some European countries, but the amount of the premium varies from crop to crop and from country to country.
- An important aspect of the profitability of organic farming is the possibility of achieving higher prices for products on the farm than for the conventional products. Prices vary significantly depending on the distribution channels.
- The use of labor is at a higher level, primarily due to the diversification of production that exists on a farm and developing new ways of marketing and processing.
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- Fixed costs are similar in the system of organic and conventional production systems in most countries.
- A premium price required to compensate for reduced outputs in organic production. The existence of such price may be explained by segmentation of the market, where consumers are allocated to higher prices of organic products and quality advantages of systems that consumers provide to systems that care about the environment.
- If we analyze income per hour of work, productivity, organic system of production is still below the best performance of conventional systems.

According to some analyses of spelt weath production in Serbia they led to the following results (Vukoje et al. 2011): variable cost per hectare increased by 56.2% in organic spelt production (din 77 718) more than in conventional production (49 746 din). The main reason is significantly higher costs of fertilizer production and certification. The cost of organic production (25906.2 din / t) is about two times higher than in conventional (12436.5 din / t). In addition to higher variable costs per unit of capacity, the reason is 25% lower yield in organic production.

Economic analysis shows that the production parameters spelt in an organic farming system may be cost-effective (cost-effectiveness ratio: 2.24; rate of return: 55.4%). However, the conventional production of spelt is still cost effective in local conditions (cost ratio: 3.3; rate of return: 69.9%) difference in the cost of fertilizer is one of the main reasons for higher total costs per 1 ha of organic spelt production in relation to conventional, and in this connection, the lower margin of coverage and other indicators of profitability. Another, more important reason, is the underdevelopment of the domestic market of products from organic production. These products are still not required, that they are more expensive compared to conventional products. In this case, it contributes to the insufficient level of product offerings spelt in the domestic market, causing the price of organic products and conventional approaches.

**Conclusion**

Successful development and economic strength of organic farms in agricultural production (and plant) depends on many economic factors, external and internal (Tomaš, M. 2010).

Agro economic analysis provides an answer to many questions that are central to the commencement of this production, as well as for its maintenance and development (improvement). Rational use of all factors of production is an important economical condition of organic farming. It is particularly important, necessary and indispensable (permanent) economic analysis of the following: profitability analysis, cost analysis and cost price, market analysis and price of organic agricultural products and analysis of gross margin. Each of these analyses is a function of productivity, efficiency, profitability and environmental sustainability as key principles of business in the modern economy. Cost analysis from this study support the hypothesis that the operating costs of production (especially in our conditions) is extremely high. This fact must be known to all social actors (especially states) who are interested in the development of organic agriculture production.

When it comes to economics and business organization of organic farms it is necessary to constantly monitor and analyze the experience of the European Union, and some developed countries, these economic groups. This experience shows, in short, that the necessary measures of agricultural policy and other methods always encouraged and supported this production (lead pricing policy). Only then, in conjunction with internal efficiency and external support from the state, it is possible to maintain and develop this important and promising agricultural production.

Economic analysis of organic agriculture shows that the production system is an attractive alternative for producers, consumers and society as a whole. It can be said that the adoption of this system of production contributes to environmental protection, brings certain benefits to the consumer, and in certain conditions, to the producers.
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