

ECONOMIC ANALYSIS OF WHEAT PRODUCTION ON FAMILY FARMS

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Abstract: Serbian agricultural producers are currently facing a large number of challenges which have a significant influence on their business activities. Continuous monitoring and evaluation of existing family farms business activities is the only way to improve their profitability and enhance competitiveness in such conditions. Bearing this in mind, the objective of this research is to emphasise an importance of the economic analysis of wheat production on family farms and to contribute successfully to the formulation of the answers to questions if and under which conditions the wheat production is profitable. In order to have a complete insight into investigated problem subject, investigations were carried out on selected family farms. Collected data were processed using calculation procedure for the purpose of determination of main economical indicators of the success of wheat production. Based on realised financial results it can be concluded that with the selling price of 10,000.00 dinars per ton, only family farms which have achieved yield of over 7.5 t/ha with adequate level of investments are profitable. Since realised average yield of wheat on family farms in the Republic of Serbia in 2009 was 3.58 t/ha and level of investment necessary for realisation of this yield, it is clear that the majority of family farms had loss in wheat production. The results of this study suggest that the economic status of the wheat production depends on the yield and achieved sales price, as well as on the amount of applied production factors and price level for their purchasing.

Key words: economic analysis, profitability, wheat, family farms.

Introduction

Wheat production in the Republic of Serbia is very important, and under the influence of a current situation in economical and social environment, is subject to certain changes, but not to the extent as in case of other crops, since this is a crop traditionally present in the production structure, often more than justified by economical criteria. The results of the research conducted by Todorović and Munćan (2009) show that wheat, although it has the lowest gross margin of all

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grown crops in optimal sowing structure of analysed family farms, participates with 30%. Discrepancy between its participation in optimal sowing structure and gross margin is explained by the fact that during the determination of optimal sowing structure, the advantage in using the available resources of family farms is given to those crops whose minimum distribution must be satisfied because of observing crop rotation restrictions. Harvested wheat areas in the last 10 years (from 2000 to 2009) varied from minimum of 487,399 ha in 2008 to maximum 693,823 ha in 2002. Share of areas under wheat of total harvested areas is below 20%. This was especially distinct in the last 2 to 3 years when areas under wheat were first reduced to below 600,000 ha, and in 2008 below 500,000 ha, which resulted in drop in wheat share by approximately 15% (Denčić et al., 2009). The greatest part of the production is realised on family farms (almost 78% of total harvested areas under wheat in the observed period were within family farms) (Figure 1).

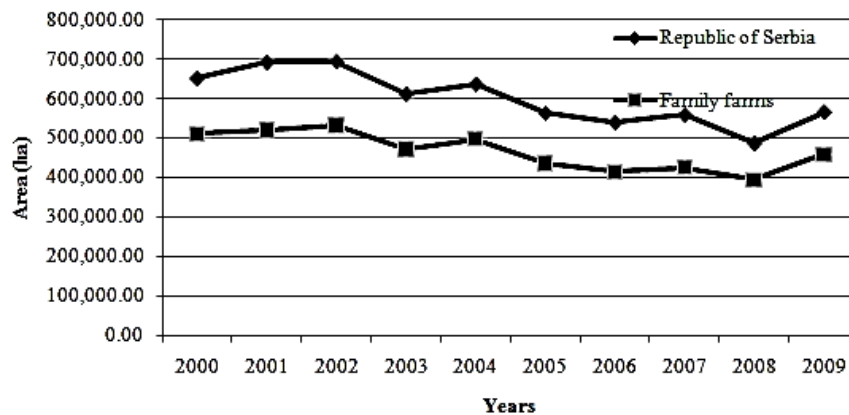


Figure 1. Trends related to harvested wheat areas in the Republic of Serbia in period from 2000 to 2009 calculated on the basis of the data of Statistical Office of the Republic of Serbia.

In this regard, special attention has to be paid to family farms, as the most significant development entities of rural areas. The welfare of the rural population depends on the success of their business operations and ability to survive in the market. Although they still exist on market, many of them will not be able to transform to the commercial farms (Todorović et al., 2009a). Dramatic changes which occurred on the market are only one in the series of challenges with which agricultural producers are faced in this production year. Namely, in conditions of the decrease of prices of primary agricultural products and the increase of prices of production inputs in agriculture, business operation of family farms is seriously

endangered, and the only way to improve the profitability and competitiveness in such conditions is continuous monitoring and assessment of achieved results. As stated by Munćan et al. (2008), it is apparent that significant resource reserves are present on the family farms, and these resources have not been sufficiently utilised. Therefore, it is necessary to find ways and create the adequate conditions to activate development potentials. In this way family farms will become competitive, their business profitable and living conditions of households will be better. However, in great number of data, mutual influences and frequent lack of assessment criteria or measures, getting to know the reality is often very long and hard work. Munćan and Živković (2006) state that without analysis you cannot learn about the objective situation, and without the objective situation you cannot set realistic goals, nor can one adequately direct the actions towards the realisation of these goals. Regarding this, Ševarlić et al. (2008) point out that agro-political practice in Serbia chronically lacks agro-economic analyses, which are valid bases for understanding production economy of certain agricultural products as well as economic position of some categories of agricultural producers. Keeping this in mind, economical analysis of wheat production on family farms was carried out in this paper, so as to achieve the goal of more successful formulation of the answer to the question if and under which conditions this production is profitable.

Materials and Methods

In order to have a complete insight into investigated problem subject, investigations were carried out on selected family farms of the Republic of Serbia. The most important characteristics of the selected family farms are:

- family farms are located in lowland regions,
- they possess only arable land of uniform quality and optimal plot size,
- arable land is used for cereals growing (wheat, maize) and industrial crops (sugar beet, sunflower and soya bean) observing crop rotation restrictions,
- total arable land is arranged for market oriented crops production,
- production technology is typical for mentioned crops and regions where family farms are located,
- two members of the family are constantly employed and
- family farms have necessary machinery for realisation of projected production technology (tractor 10 kN, tractor 20 kN, combine and appropriate implements).

Collected data were processed using calculation procedure for the purpose of determination of main economical indicators of the success of wheat production.

Values trends of obtained indicators were used as a basis for assessment of economic position of observed family farms, bearing in mind that every increase of values of these indicators is considered a positive trend, and that the decrease points at worsening of economic position and can be one of indicators of business crisis.

Results and Discussion

Changes which occurred in the last year on the market of primary agricultural products and production inputs in agriculture had significant effect on profitability of wheat production. In such conditions, many family farms were not able to provide necessary financial means which influenced the decrease in the investment level. Considering the above mentioned, in order to obtain complete picture, analytical calculation of wheat production on family farms was carried out for different investments levels (Table 1).

This financial result of wheat production, manifested in increase of production costs and decrease of the price of primary agricultural products, is expected with respect to worsening of conditions in which family farms operated in 2009. Based on realised financial results, it can be concluded that with the selling price of 10,000 dinars per ton, only family farms which achieved yield of over 7.5 t/ha with an adequate investment level are profitable. Taking into account realised average yield of wheat on family farms in the Republic of Serbia in 2009 which was 3.58 t/ha and the level of investment necessary for the realisation of this yield, it is clear that majority of family farms suffered loss in wheat production. Also, what is the most alarming is the fact that with the yield of 3.58 t/ha, family farms cannot cover even the variable production costs.

Table 1. Analytical calculation of wheat production on family farms in the 2008/2009 for different investment levels (price of wheat 10,000.00 RSD/t).

Description	Yield Level (t/ha)				
	3.5	4.5	5.5	6.5	7.5
I Gross income (RSD/ha)^a					
1. Crop revenue	35,000	45,000	55,000	65,000	75,000
II Costs (RSD/ha)					
1. Variable costs	40,946.6	45,634.1	50,321.5	55,008.9	59,696.3
1.1. Seed	7,500.0	7,500.0	7,500.0	7,500.0	7,500.0
1.2. Fertilizer	14,890.9	19,145.5	23,400.0	27,654.5	31,909.1
1.3. Pesticide	1,500.0	1,500.0	1,500.0	1,500.0	1,500.0
1.4. Fuel, oil, repair and maintenance	13,357.3	13,357.3	13,357.3	13,357.3	13,357.3
1.5. Other variable costs	3,698.4	4,131.3	4,564.2	4,997.1	5,429.9
2. Fixed costs	15,137.0	15,137.0	15,137.0	15,137.0	15,137.0
3. Total of all costs	56,083.6	60,771.0	65,458.5	70,145.9	74,833.3
III					
Profit (RSD/ha)	-21,083.6	-15,771.0	-10,458.5	-5,149.9	166.7
Profit (%)	-60.24	-35.05	-19.02	-7.92	0.22

^a Government subsidies and incentives are not included in calculation

Considering current trends in economy and agriculture, it is very difficult to expect the decrease of production costs. Therefore, it is extremely important to identify dominant groups of costs in wheat production (Figure 2) in order to potentially make some savings. Reducing investments in production and at the same time maintaining the high yields for the purpose of higher economical gain is interest of the producers of all crops, even wheat, which is as Munčan and Živković (2004) state the requirement for maximum economical efficiency, i.e. realisation of minimum-maximum principle which in organisation of business operation means: realisation of maximum results (outputs) with minimum resource investments (inputs).

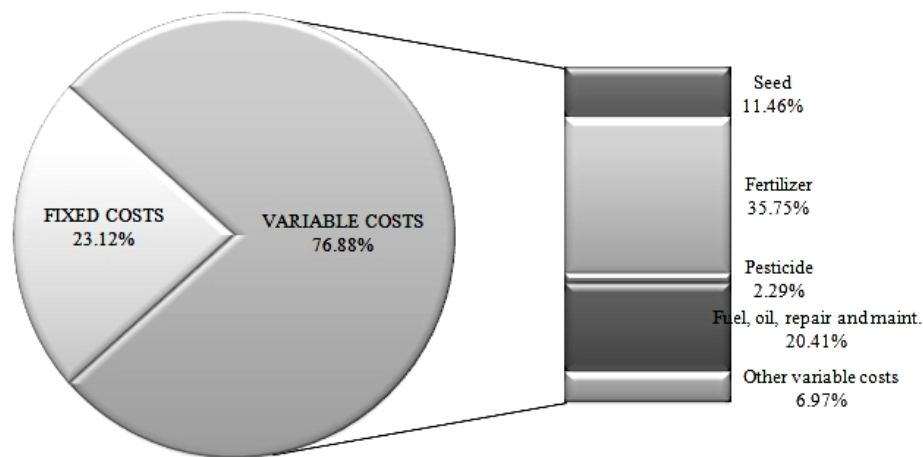


Figure 2. Structure of costs in wheat production on family farms in the 2008/2009 (yield 5.5 t/ha).

The most significant item in costs of wheat production (35.75%) is the cost of mineral fertilizer, which is due to high purchasing price of this commodity in the observed production year. Potential savings in mineral fertilizers applied by some family farms in case of a lack of financial means and favourable sources of financing cannot be considered as rationalisation, because a reduced investment in technical measures were applied, which included application of adequate quantities of mineral fertilizer, even in conditions of the high purchasing price of this input, has economical justification considering its contribution to the increase of profitability of the production (Table 1). However, regarding the high price of mineral fertilizers, many family farms were not able to apply the sufficient amount of this input, which reflected negatively on yield, and on profitability of the

production. So, it can be concluded that in this production year, conditions for more intensive investments were not provided, as necessary assumption for increase of yield per unit of area, and in this way realisation of more profitable production. Keeping this in mind, it is necessary to consider a wide range of possibilities for the elimination of the usual production practice and application of new technologies and new types of machines and tools in wheat production. Therefore, the economic analysis conducted by Todorović et al. (2009b) shows that a change in technology and application of new types of machines and tools in crop production is economically justified, given that there is a reduction of variable costs per kilogram of produced crop.

However, in case of fuel costs, costs of lubricants and machinery repair and maintenance, as stated by Vasiljević et al. (2008) a purposeful and timely realisation of adequate measures in the field of management is necessary in order to increase the efficiency of agricultural machinery and minimize the cost of their use. This is certainly one of the sure ways to alleviate consequences of high fuel costs which is predominantly under the influence of global trends on the market.

Considering the high share of fixed costs (23.12%) it is necessary to find the solution for their reduction, using the fact, as stated by Gogić (2005), that fixed costs do not change with the change of the production level or degree of the utilization of capacities, i.e. their total amount remains the same regardless of the quantity of produced products or services performed, which will reflect on financial results of the production.

For the purpose of investigation of the influence of selling price and realised yield on variations of realised profit in wheat production, the adequate analysis was carried out (Table 2).

Table 2. Realised profit (RSD/ha) in wheat production on family farms in the 2008/2009 depending on realised selling price and realised yield of wheat.

Price (RSD/t)	Yield Level (t/ha)				
	3.5	4.5	5.5	6.5	7.5
7,000.00	-31,583.62	-29,271.04	-26,958.46	-24,645.88	-22,333.29
8,500.00	-26,333.62	-22,521.04	-18,708.46	-14,895.88	-11,083.29
10,000.00	-21,083.62	-15,771.04	-10,458.46	-5,145.88	166.71
11,500.00	-15,833.62	-9,021.04	-2,208.46	4,604.12	11,416.71
13,000.00	-10,583.62	-2,271.04	6,041.54	14,354.12	22,666.71
14,500.00	-5,333.62	4,478.96	14,291.54	24,104.12	33,916.71
16,000.00	-83.62	11,228.96	22,541.54	33,854.12	45,166.71
17,500.00	5,166.38	17,978.96	30,791.54	43,604.12	56,416.71

In case of production yield of 5.5 t/ha, wheat production is not profitable if the selling price is less than 11,901.54 dinars per ton. Considering market price of wheat is 10,000 dinars per ton, this means that wheat production is profitable, as already stated, only if realised yield is higher than 7.5 t/ha. On the other hand, with the price of wheat of 13,000 dinars per ton (price according to which Republic Directorate for Commodity Reserves purchased 65,714 t of wheat of this year crop), wheat production becomes profitable if realised yield is higher than 4.8 t/ha. It is necessary to point out that family farms which realised the yield of over 5.5 t/ha managed to cover variable production costs even with the current price of 10,000 dinars per ton, and with price of 13,000 dinars per ton even to realise profit. Therefore, higher selling price of wheat and higher yield result in changes, which have a positive effect on profitability of wheat production as well as on family farms in general.

Conclusion

Based on realised financial results it can be concluded that with the selling price of 10,000 dinars per ton, only family farms which have achieved yield of over 7.5 t/ha with adequate level of investments are profitable. Since realised average yield of wheat on family farms in the Republic of Serbia in 2009 was 3.58 t/ha and level of investment necessary for realisation of this yield, it is clear that the majority of family farms had loss in wheat production.

Regardless of the conclusions related to conditions under which wheat production is profitable, the final conclusion cannot be made without an additional analysis, because family farms are different in size and/or rely on different production technologies, which is the reason for differences in profitability of production. However, what is common for all of them is the fact that in this year they can expect a decrease of profit or even a complete absence of it in wheat production.

Based on the results of conducted research it can be concluded that the economical position of this production is influenced by the realised yield and selling price, as well as by the amount of applied production factors and prices level of their purchasing.

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EKONOMSKA ANALIZA PROIZVODNJE PŠENICE
NA PORODIČNIM GAZDINSTVIMA

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R e z i m e

Poljoprivredni proizvođači u Srbiji suočavaju se sa velikim brojem izazova koji prete da značajno ugroze njihovo poslovanje. Jedini put za poboljšanje profitabilnosti i unapređenje konkurentnosti u takvim uslovima je kontinuirano praćenje i ocenjivanje ostvarenih rezultata. Imajući to u vidu u radu je izvršena ekonomska analiza proizvodnje pšenice na porodičnim gazdinstvima, a sve u cilju što uspešnijeg formulisanja odgovora na pitanje da li je i pod kojim uslovima ova proizvodnja profitabilna. Kako bi se istraživana problematika što potpunije sagledala izvršena su istraživanja na odabranim porodičnim gazdinstvima. Prikupljeni podaci obrađeni su pomoću kalkulativnog računskog postupka u svrhu utvrđivanja osnovnih ekonomskih pokazatelja uspešnosti proizvodnje pšenice. Na osnovu ostvarenih finansijskih rezultata može se konstatovati da uz prodajnu cenu od 10,000 dinara po toni profitabilnu proizvodnju imaju samo ona gazdinstva koja su uz odgovarajući nivo ulaganja ostvarila prinos veći od 7,5 t/ha. Imajući u vidu da je ostvareni prosečan prinos pšenice na porodičnim gazdinstvima u Republici Srbiji u 2009. godini 3,58 t/ha i potreban nivo ulaganja za njegovo ostvarenje onda je sasvim jasno da je najveći broj gazdinstava ostvario gubitak u proizvodnji pšenice. Rezultati sprovedenog istraživanja sugerišu da je ekonomski položaj ove proizvodnje uslovljen visinom ostvarenog prinosa i ostvarenom prodajnom cenom, kao i količinom primenjenih činilaca proizvodnje i nivoom cena za njihovo pribavljanje.

Ključne reči: ekonomska analiza, profitabilnost, pšenica, porodična gazdinstva.

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