

ECONOMIC ASPECTS OF INVESTMENT IN WHEAT PROCESSING¹

Marko Jeločnik², Jonel Subić³, Velibor Potrebić⁴

Abstract

In order to strengthen the competitiveness of agriculture, there come to notable increase in state support for investments in improvement of production and processing on individual or joined agricultural holdings in Serbia. Accordingly, paper is focused to assessing of economic effectiveness of investments in processing of wheat in selected agricultural cooperative. The business idea and cooperative needs assume the modernization and completion of the facilities for the wheat processing and production of mill products (human and animal flour). There is the plan to purchase electromechanical modular truck scale, a steel silo for wheat storing, stretch machine, equipment for quality control of wheat that enters the milling process and equipment for increasing the mill capacity and finished products quality. It is expected that with this investment, the cooperative would directly affect the strengthening of its competitiveness, while additional employment would indirectly affect the development of the local community. Considering that realization of the business idea relies partly on own funds, and partly on public incentives, in paper was made an assessment of the economic effectiveness of investment in purchase of equipment used in mill industry.

Key words: *economic effectiveness, investments, incentives, wheat, flour, agricultural cooperative.*

Introduction

In line to high nutritional value, wheat represents one of the most widely grown and used crops worldwide, specifically grain, in human diet. Besides, it is also very valuable as a feed or a raw material in food and processing industries. By produced quantities, its production globally guarantees the food safety for the majority of population, securing the high share within the world market and economy.

1 Paper is a part of research financed by the MESTD RS and agreed in decision no. 451-03-9/2021-14.

2 *Marko Jeločnik*, Ph.D., Research Associate, Institute of Agricultural Economics, Volgina Street no. 15, 11060 Belgrade, Serbia, Phone: +381 11 69 72 858, E-mail: marko_j@iep.bg.ac.rs

3 *Jonel Subić*, Ph.D., Principal Research Fellow, Institute of Agricultural Economics, Volgina Street no. 15, 11060 Belgrade, Serbia, Phone: +381 11 69 72 858, E-mail: jonel_s@iep.bg.ac.rs

4 *Velibor Potrebić*, M.A., Professional Associate, Institute of Agricultural Economics, Volgina Street no. 15, 11060 Belgrade, Serbia, Phone: +381 11 69 72 858, E-mail: velibor_p@iep.bg.ac.rs

Achieved wheat yields oscillation results due to occurrence of many factors, primarily used variety and environmental characteristics, as well as used production technology, conducted agro-technical measures and applied crop (Dončić et al., 2019).

Some recent estimations show that wheat takes over the 25% of global areas under the grains, achieving the average yield around 2.7 t/ha. Along the increase in world population and pooled demand for wheat and wheat products, in upcoming period global food security will be fully satisfied with yields grow up to 3.8 t/ha (Dimitrijević et al., 2020).

Among the farms involved in crop production in Serbia, the most of them are oriented to wheat. Nationally, maize and wheat are two leading crops, where in overall sowing structure (over the 3,4 ha of utilized agricultural areas) wheat takes around 17% of available UAA with the annual production above the two million tons (Popović, Kovljenić, 2017). Although the wheat is present in all regions of Serbia, the most significant wheat-producing area is the province of Vojvodina (Janić Hajnal et al., 2015). To wheat is given strategic position, ensuring the food security at national level, while certain quantities are turned to export, mainly as raw material (Jeločnik et al., 2021).

Despite the large areas under the wheat in Serbia, and fact that its production is highly dependent to water availability, unfortunately it is mainly produced in rain-fed system of production. Really soon, related to often presence of climate change accidents (primarily drought), sustainability of wheat production could be efficiently supported just with more intensive introduction of irrigation (Jeločnik et al., 2019).

As was previously mentioned, national policymakers assign to wheat special status, along to food self-sufficiency, its greater use in food processing and huge export potential. Most often, penetration to international market is linked to introduction of quality standard schemes, upgrade of technological approach in production, implementation of full marketing orientation, etc. (Ignjatijević et al., 2018).

Wheat production is usually characterized by significant variation in yields and grain quality, where quality variations could exist even in the same production parcel. Just few years ago grain buyers have been starting to classify and pay the wheat by its quality, avoiding the potential economic and technological problems to processors (Đurić et al., 2020). Wheat is a crop with long tradition in Serbia and one of the indispensable parts in crop rotation. On the other side,

from the economic aspect, in spite to simple production requirement farmers usually do not have adequate economic benefit in its growing, as it gives one of the lowest contribution margins within the sector of crop production (Todorović, Filipović, 2010).

So, global production, processing and trade of wheat have positive tendencies, while in Serbia production has negative trend, initiated by the lack of economic interest for investment in wheat production, as its burdened by costs-income and price disparities, uncertainty of realization, etc. (Marković et al., 2013). Price of wheat produced in Serbia is usually lower than average price in global market (Djuric et al., 2015). Besides, prices of used inputs (certified seed, fertilizers, pesticides, energy, etc.) are not so rare much above that worldwide average. So, facing the low profitability in wheat production at farm level generally could be changed with generation of value added in farm yard, for example through the wheat processing, and later selling of wheat products.

It has to be mentioned, that for a long time running of any level of economic crisis in Serbia is mostly followed by the price transmission within the wheat to bread supply chain that is not so favorable for the primary production (wheat producers). In the period of constant growth of food prices, despite the conduction of comprehensive support by the local authorities, the worst effects are experiencing the primary producers and final consumers. Grain producers are facing the minimal contribution margins, while consumers are facing growing flour, bread and other pastries prices, leading to assumption that wheat processors and retail chains are taking the largest part of gained profit (Djuric, Götz, 2016).

Vertical integration and establishment of wheat processing (for example the first level of processing - flour production) is not cheap project, and usually is financially impossible for a single farms. It could require farmer's common action, as are forming of agricultural cooperative.

According to last census of agriculture, there are just few hundreds agricultural cooperatives in Serbia that joins few thousand members and couple hundred thousand subcontractors (Simonović et al., 2016). Guided by the direct support of the Ministry of Agriculture and Ministry of Rural Welfare, or specifically, initiated by the project 500 cooperatives in 500 villages from the mid of 2017 to present moment there are established over the 600 new agricultural cooperatives, so currently is active over the 1,500 of them. For that purposes in less than three year was reallocated to the old and new agri-cooperatives over the 15 million EUR (Rajevic, 2019). Main goal of given support was to boost both

the competitiveness of farms involved in crop and animal production, as well as competitiveness of overall sector of national agriculture.

Methodology and data used

The main goal of this paper is to show does the investment in wheat processing could be economically justified business alternative for certain farms' association, specifically cooperative.

Applied methodological framework includes static (Total output-total input ratio, Net profit margin, Accounting rate of return, and Simple payback period) and dynamic (Net present value, Internal rate of return, and Dynamic payback period) methods for evaluation of economic effects of investment done in wheat processing. All data used within the paper are gained through the in-depth interview with the director of selected agricultural cooperative active in crop production and wheat processing. Cooperative is located in Central Serbia, while interview was done during the mid of 2021. For boosting the scientific and practical value of the paper, adequate scientific and professional literature sources were also used. Evaluated investment, its technical and financial elements are so realistic.

Results with discussion

The cooperative has long tradition in grain production. In last few decades, it has also been active in wheat processing. The cooperative wants to access a free public grant and to invest in project idea that assumes modernization and full equipping the grain processing facility, i.e. facility for production of mill products (human and animal flour). Investment involves the purchase of missing equipment which will complete the wheat processing, as well as technologically and economically improve the business, increase processing quantities, improve the quality of final products, and attract new subcontractors, what would directly strengthen the competitiveness of the agricultural cooperative. Additionally, two external workers would be employed. It is planned to purchase the electromechanical modular truck scale, steel silo for storing the wheat, stretch machine, equipment for quality control of raw material that enters the milling process, and equipment that will increase the mill capacity and quality of final products. All equipment is purchased as new.

Wheat processing assumes the following matrix. All cooperators and subcontractors are linked to production of the raw material base (cereals, mostly wheat),

which is purchased by the cooperative. Additionally, cooperative make finalization of the raw material (drying, checking and possible mechanical cleaning of grains), grinding it into the human and animal flour, adequately packing (in 25 kg and 30 kg bags) and further selling to well-known local customers. Besides, the cooperative supplies the cooperators with the necessary inputs (mineral fertilizers, seeds, pesticides and mechanization services), asking the payment upon the grain delivery.

Assessment indicators of the planned investment are visible in the next table (Table 1.). There are some brief explanations that follow the investment. Around 91% will be invested in fixed assets, while the rest will be turned to covering of required permanent working capital. Over the 55% of overall investment represents the value of required facilities. More than 10% of investment will be covered by own financial resources. Rest will be granted by public support. It was assumed the 5 years lifecycle of the investment that is in line to usual credit period approved for that purposes. Besides, it was assumed constant level of annual sale incomes derived from investment usage (according to constant production volume and fixed prices of the products). Their annual value is almost 10 million RSD. Overall incomes involves the local market price of realized human (type 400 and 500) and animal wheat flour (milling wastes). Required production costs also assume fixed annual sums. They amount slightly over the 7.5 million RSD. In their overall sum dominates material costs with over the 60%, while in them more than 95% comes to direct material (purchased wheat as a raw material). Over the all 5 years the investment exploitation is liquid and brings to annual net profit of almost 2.1 million RSD. Related to current circumstances at the national capital market, observed discount rate was set to 7%.

In same manner, there are some brief explanations of gained results after investment analysis. Related to static assessment of investment, while observing the fifth, representative year of investment use, i.e. year when the investment is exploited in its full capacity, it could be seen that:

Value of the Total output/total input ratio, i.e. Economical-efficiency coefficient is greater than one, meaning that gained incomes are over the overall production costs. So, investment sounds to be economic, and economically justified. Value of the Net profit margin ratio is above the assumed price of the capital, 7%, meaning that investment shows strong accumulative potential, or during the investment use it could be expected certain level of profit after the covering of required price of capital. Same as previous is with the value of accounting rate of return, meaning

that investment could be seen as profitable for the cooperative. Related to gained Simple payback period of 4.27 years, investment could be also labeled as economically justified, as it could cover invested assets for less than 5 years.

Table 1. Investment in wheat processing: Evaluation of the project idea.

No.	Description	
1.	Investment project	
1.1.	Title of the investment project	Building the storing capacities for grains and purchase of equipment for mill products production (human and animal flour)
1.2.	Investor	Agricultural cooperative
1.3.	Location	Central Serbia – Kragujevac
2.	Estimated value of investment (in RSD)	
2.1.	Total investment	16.668.040,30
2.2.	Investment in fixed assets	15.152.763,91
2.3.	Investment in permanent working capital	1.515.276,39
3.	Source of financing	
3.1.	Total source of financing	16.668.040,30
3.2.	Internal financial resources	1.686.299,50
3.3.	External financial resources	14.981.740,80
4.	Object of investment project	
4.1.	Purpose of investing	Investment in fixed assets
4.2.	Start of investing	During the 2022
4.3.	End of investing	During the 2022
4.4.	Economic life of the investment	5 (five) years
4.5.	Sales market	National
5.	Expected effects of investment	
5.1.	<i>Static assessment</i>	
5.1.1.	Economical-efficiency coefficient	1,33
5.1.2.	Net profit margin ratio	20,97
5.1.3.	Accounting rate of return	12,55
5.1.4.	Simple payback period	4 years and 3,21 months
5.2.	<i>Dynamic assessment</i>	
5.2.1.	Net present value	4.395.087,63
5.2.2.	Internal rate of return	14,21
5.2.3.	Dynamic payback period	4 years and 6,82 months
5.3.	Break-even point (relative)	6,83
5.4.	Additionally employed staff	2
6.	Exchange rate	117,6 RSD = 1 EUR

Source: IAE, 2021.

In line to dynamic assessment of the project economic effects, there are few things that have to be mentioned. Firstly, in the period of 5 years of investment use it could be enable to cooperative enlargement of the profit in amount of almost 4.4 million RSD (discounting to the zero moment, or moment of investing). Investment is fully profitable, as gained Internal rate of return is more than doubled compared to observed discount rate. In line to gained Dynamic payback period of 4.57 years, investment could be also considered as economically justified.

Having in mind the assessment of the project effects in conditions of risk and uncertainty, accenting the break-even point of wheat processing, it could be seen that positive business results are secured if the volume of production does not fall below the 6.83%.

Conclusions

Crop production, especially growing of grains could be very limiting for the securing of expected level of development of certain farm at national level. Although the wheat represents one of basic raw products used for preserving the national food security, unfortunately this line of crop production gives relatively small contribution margins and profit for average farm. Adequate alternative farmers could found in vertical integration, or cooperation within the crop production.

It was found that investment in wheat processing (primarily flour production), based on state support directed to cooperatives, could be economically justified and sustainable. Besides, creation of value added gives the cooperators, joined farms, additional maneuver space to maintain the expected profit in by yields bad production years, mainly affected by drought. Surely, with employment of two additional persons, investment has also positive impact to development of local rural community.

Literature

1. Dimitrijević, A., Gavrilović, M., Ivanović, S., Mileusnić, Z., Miodragović, R., Todorović, S. (2020). Energy use and economic analysis of fertilizer use in wheat and sugar beet production in Serbia. *Energies*, 13(9/2361):1-12.
2. Djuric, I., Götz, L. (2016). Export restrictions: Do consumers really benefit? The wheat-to-bread supply chain in Serbia. *Food Policy*, 63:112-123.
3. Djuric, I., Götz, L., Glauben, T. (2015). Are export restrictions an effective instrument to insulate domestic prices against skyrocketing world market prices? The wheat export ban in Serbia. *Agribusiness*, 31(2):215-228.

4. Dončić, D., Popović, V., Lakić, Ž., Popović, D., Petković, Z. (2019). Economic analysis of wheat production and applied marketing management. *Agriculture & Forestry*, 65(4):91-100.
5. Đurić, N., Cvijanović, G., Rajičić, V., Branković, G., Poštić, D., Cvijanović, V. (2020). Analiza prinosa zrna i kvaliteta brašna nekih sorata ozime pšenice u proizvodnoj 2020. godini. *Agronomski glasnik: Glasilo Hrvatskog agronomskog društva*, 82(5-6):253-262.
6. IAE (2021). *Data from the in-depth interview with management of the selected cooperative*. Internal data, Institute of Agricultural Economics, Belgrade, Serbia.
7. Ignjatijević, S., Čavlin, M., Jahić, M. (2018). The impact of relevant factors on wheat supply and demand in the Republic of Serbia. *Ekonomika poljoprivrede*, 65(1):143-156.
8. Janić Hajnal, E., Orčić, D., Torbica, A., Kos, J., Mastilović, J., Škrinjar, M. (2015). Alternaria toxins in wheat from the Autonomous Province of Vojvodina, Serbia: A preliminary survey. *Food Additives & Contaminants: Part A*, 32(3):361-370.
9. Jeločnik, M., Subić, J., Nastić, L. (2021). *Upravljanje troškovima na poljoprivrednim gazdinstvima*. Institut za ekonomiku poljoprivrede, Beograd, Srbija, pp. 402.
10. Jeločnik, M., Zubović, J., Zdravković, A. (2019). Estimating impact of weather factors on wheat yields by using panel model approach: The case of Serbia. *Agricultural water management*, 221:493-501.
11. Marković, J., Prodanović, R., Mutibarić, J. (2013). Proizvodnja i promet pšenice u Srbiji. *Ekonomika*, 59(2):92-100.
12. Popović, R., Koveljenić, M. (2017). Efficiency of wheat production in Republic of Serbia. *Ekonomika poljoprivrede*, 64(4):1499-1511.
13. Rajevic, K. (2019). *Zadruga spas za male poljoprivrednike*. Poljoprivrednik, no. December 2019, retrieved at: www.poljoprivrednik.net/poljoprivreda/zadugarstvo/4752-akcija-500-zadruga-u-500-sela-srbije-znacajno-izmenila-sliku-o-zadugama-i-zadugarstvu-u-srbiji, 12th December 2021.
14. Simonović, Z., Mihailović, B., Milovanović, Z. (2016). Cooperatives and farmers association as a model of entrepreneurship in Serbian agriculture regarding the case of Nišava district. *Ekonomika poljoprivrede*, 63(2):699-712.
15. Todorović, S., Filipović, N. (2010). Economic analysis of wheat production on family farms. *Journal of Agricultural Sciences*, 55(1):79-87.