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PARADIGMA COST ACCOUNTING METHODS IN PRODUCTION ECONOMICS OF A SMALL ENTERPRENEUR

PARADIGMA METODA TROŠKOVNOG RAČUNOVODSTVA U EKONOMICI PROIZVODNJE MALOG PODUZETNIKA

ABSTRACT

This paper illustrates the method of calculating of production economics of a small entrepreneur who applies single-entry accounting. Based on a business case of a small family farm business, the authors compare three different reports on production economics calculated on the basis of the outlined methodological approach. The authors apply single-entry and double-entry accounting techniques, managerial accounting techniques (Volume Based Costing and Activity Based Costing methods) and techniques of financial analysis. This paper proves the necessity of keeping detailed record of assets used in the production process in cases when different calculation methods are applied, and when the applying of a certain method depends on the quality of the informational basis. This paper also proves the reliability of the outlined methodological approach for determining of accurate data on production economics based on single-entry-accounting information.

Key words: *single-entry accounting, double-entry accounting, ABC method, VBC method, small entrepreneur*

ABSTRACT

U ovom radu se prezentira postupak izračuna ekonomike proizvodnje malog poduzetnika koji vodi jednostavno knjigovodstvo. Na praktičnom primjeru proizvodnje obiteljskog poljoprivrednog gospodarstva izračunavaju se tri izvještaja o ekonomici proizvodnje prema opisanom metodološkom postupku i kompariraju se dobiveni rezultati. U radu se koriste tehnike jednostavnog i dvojnog knjigovodstva, upravljačkog računovodstva (Volume Based

Costing i Activitiy Based Costing metode) i tehnike financijske analize. U radu se dokazuje nužnost vođenja evidencije upotrebe osnovnih sredstava u stvaranju proizvodnih učinaka (proizvoda ili usluga) kada se primjenjuju različite metode za izračune i kada njihov izbor ovisi o kvaliteti informacijske podloge. Također, u radu se dokazuje realitet metodološkog postupka za utvrđivanje točnih rezultata ekonomike proizvodnje kada je informacijska osnova jednostavno knjigovodstvo.

Ključne riječi: *jednostavno knjigovodstvo, dvojno knjigovodstvo, ABC metoda, VBC metoda, mali poduzetnik*

1. Single-entry vs. double-entry accounting

Small family farms (OPG) and craft businesses which generate less than 2 millions HRK of revenues onan annual basis are obliged by the law to apply single-entry accounting. Corporations, family farms and craft businesses with annual revenues over 2 millions HRK are obliged to apply double-entry accounting. The method of single-entry accounting does not provide accurate data on business performance (profits), largely due to the fact that its main purpose is to determine the income-tax base and to meet the required informational conditions of the control system of the state. On the other side, the profit and loss statements of enterprises applying double-entry accounting provide detailed information on their business performance (i.e. profit or loss). Therefore, the income of a small family farm (OPG) applying single-entry accounting essentially differs from the profit of a corporation applying double-entry accounting. The profit of a corporation is its business result, while the income of a small family farm is its income-tax base. This paper applies techniques of a static financial analysis on an example of a small family farm business which uses agricultural machinery, land and human capital in the production process, and whose business performance cannot be determined solely by using its single-entry-accounting-based reports/documentation. The first step before calculating the production economics per agricultural cultures is to determine the exact business result. Hence, the application of various accounting techniques and double-entry accounting methods is used to calculate the total business performance of a small family farm. Calculating of production economics of agricultural cultures is based on a specifically for this purpose compounded report on business performance. In agricultural production, it is possible to sort out variable costs from fixed costs and direct costs from indirect costs. Such sorting-out is the main precondition for calculating of agricultural production economics. A financial analyst can also apply some of the methods of indirect costs allocation. The quality of the informational basis and the nature of the production process largely determine which method and/or a combination of methods will be used. Both, an accurate record of business events and the quality of the informational basis substantially affect the quality of reports on production economics whose major purpose is the serve as a basis for quality decision making.

2. Methodology for calculating of production economics based on data from single-entry accounting

The process of determining the business performance of an entrepreneur applying single-entry accounting includes six steps:

1. Determining of revenues/expenses from the book of incoming/outgoing invoices
2. Determining of realistic depreciation costs from the list of long-term assets

3. Determining of realistic costs of assets not registered on business's list of long-term assets, but used in regular business operations
4. Determining of the cost of human capital
5. Determining of the direct cost of raw materials
6. Determining of the realistic value of inventory of final products at the beginning and at the end of an accounting period

After having compounded the report on business performance based on the six outlined steps, a financial analyst has enough quality information to precisely calculate agricultural production economics of a small family farm applying single-entry accounting. Sorting out of direct costs from indirect costs (per specific agricultural culture) has to done as well. Direct costs which can easily be determined are the cost of labour, the cost of raw materials and the cost of services. A survey conducted in 2012 and based on 30 small family farms in Vukovar-Syrmia County, Croatia (Grebenar, Banović, Bošnjak, 2012) stated that 90% of small family farm businesses do not keep accurate records on agricultural machinery used in the production process. Without a quality informational basis on the usage of assets in the production process, all occurred costs which relate to usage of assets in the production process are documented as general (indirect) production costs. In such a case, a financial analyst can allocate such documented costs either on a basis of generated revenues or expenses or the land area used in the production process. The quality of the informational basis and the nature of the production process determine which method will be the most suitable.Both, an accurate record of business events and the quality of the informational basis substantially affect the quality of generated reports on production economics, thus directly affectingthe quality of business decision making. A financial analyst can also compound several different reports and compare them. The report which generates the smallest amount of indirect costs is the most reliable one. The method which reduces the share of indirect costs in total costs and transforms them into direct costs is the *Activity Based Costing* (ABC) method. An alternative method which can be used is the *Volume Based Costing* (VBC) method.

3. Calculating of production economics (Activity Based Costing vs. Volume Based Costing)

For the purpose of this paper, the ABC and the VBC methods are applied on a business case of a small family farm which produces 5 products (i.e. 5 agricultural cultures: corn, wheat, beet, soy and sunflower) on a total land area of 259 ha. In the production process, the family farm uses agricultural machinery, land and labour work. In the respective business case, the working hours of used machinery as well as the direct costs of consumed energy per a piece of machinery are determined. This means that every piece of machinery will serve as a cost pool[1]. Other occurred costs related to machinery are registration costs, maintenance costs and depreciation costs. The key (driver[2])for cost allocation in the ABC method is a working hour of a machine. Based on total working hours and total costs of a machine, the cost per hour of a machine can easily be determined (cost rate)[3] by applying the following formula:

(Depreciation+maintenance+energy+registration) / Working hours of a machine = **Cost rate**

[1]Hilton, R. (2009).Managerial Accounting: Creating Value in a Dynamic Business Environment. New York: McGraw-Hill Irwin.
[2]Hilton, R. (2009). Managerial Accounting: Creating Value in a Dynamic Business Environment. New York: McGraw-Hill Irwin.
[3] Hilton, R. (2009). Managerial Accounting: Creating Value in a Dynamic Business Environment. New York: McGraw-Hill Irwin

The depreciation cost of buildings (storage houses) is determined in the same way. This cost is allocated on the basis of the surface used for storage of each product (i.e. agricultural culture). Out of all general costs, only the cost of some services (telephone, some overhead expenses etc.) and a part of the cost for personal usage could not be allocated by applying the ABC method and this is why the VBC method was used for allocation of these costs. Tables 1, 2 and 3 illustrate reports on agricultural production economics compounded by applying the outlined methodological approach.

Table 1 *Agricultural production economics (VBC method) – driver: revenue*

	REVENUES/EXPENSES		Corn		Wheat		Beet		Soy		Sunflower	
		ha / culture:	35		138		47		4		35	
		In HRK	In HRK	%	In HRK	%	In HRK	%	In HRK	%	In HRK	%
	EXPENSES											
	TOTAL DIRECT COSTS	**1.481.283**	**169.597**		**612.673**		**524.157**		**22.228**		**152.627**	
1	**DIRECT COSTS OF HUMAN LABOUR**	**333.909**	**47.081**		**146.920**		**86.816**		**9.016**		**44.076**	
2	Direct costs of human labour	333.909	47.081		146.920		86.816		9.016		44.076	
3	**DIRECT COSTS OF MATERIAL/SERVICES**	**1.147.374**	**122.516**		**465.753**		**437.341**		**13.212**		**108.551**	
4	Raw material	997.507	109.027		412.569		369.177		11.671		95.062	
5	Outsourced services	50.050	0		0		50.050		0		0	
6	Other costs	99.817	13.489		53.185		18.114		1.542		13.489	
	TOTAL GENERAL COSTS	**950.732**	**111.482**		**381.460**		**341.460**		**14.096**		**102.235**	
7	**GENERAL COSTS**	**74.873**	**8.780**		**30.041**		**26.891**		**1.110**		**8.051**	
8	Services	49.540	5.809	11,7%	19.877	40,1%	17.793	35,9%	734	1,5%	5.327	10,8%
9	Costs for personal (own) purposes	25.333	2.971	11,7%	10.164	40,1%	9.098	35,9%	376	1,5%	2.724	10,8%
10	**MACHINERY**	**845.769**	**99.174**		**339.346**		**303.762**		**12.539**		**90.948**	
11	Energy	155.647	18.251	11,7%	62.450	40,1%	55.901	35,9%	2.308	1,5%	16.737	10,8%
12	Spare parts	49.430	5.796	11,7%	19.833	40,1%	17.753	35,9%	733	1,5%	5.315	10,8%
13	Depreciation	640.692	75.127	11,7%	257.064	40,1%	230.108	35,9%	9.499	1,5%	68.895	10,8%
14	**DEPRECIATION OF BUILDINGS**	**30.090**	**3.528**		**12.073**		**10.807**		**446**		**3.236**	
15	Storage houses	30.090	3.528	11,7%	12.073	40,1%	10.807	35,9%	446	1,5%	3.236	10,8%
	TOTAL COSTS	**2.432.015**	**281.079**		**994.133**		**865.616**		**36.324**		**254.862**	
	REVENUES											
16	Revenues from grants	460.200	54.250		213.900		131.600		6.200		54.250	
17	Revenues from sales	2.731.397	319.994		1.066.657		1.014.676		41.119		288.951	
18	Other revenues	0	0		0		0		0		0	
	TOTAL REVENUES	**3.191.597**	**374.244**		**1.280.557**		**1.146.276**		**47.319**		**343.201**	
	PRODUCTION ECONOMICS											
19	Produced in kg		*350.000*		*938.400*		*3.431.000*		*14.400*		*133.000*	
20	**Cost of production (kn/kg)**		**0,80**		**1,06**		**0,25**		**2,52**		**1,92**	
21	**Revenue per unit (kn/kg)**		**1,07**		**1,36**		**0,33**		**3,29**		**2,58**	
22	**Profit per unit (kn/kg)**		**0,27**		**0,31**		**0,08**		**0,76**		**0,66**	
	Profit per agricultural culture (kn)	**759.582**	**93.165**		**286.424**		**280.660**		**10.995**		**88.339**	

Source: Financial documentation of a small family farm business in Vukovar-Syrmia County, Croatia

Table 2 *Agricultural production economics (VBC method) – driver: direct costs*

	REVENUES/EXPENSES		Corn		Wheat		Beet		Soy		Sunflower	
		ha / culture:	35		138		47		4		35	
		In HRK	In HRK	%	In HRK	%	In HRK		In HRK	In HRK	%	In HRK
EXPENSES												
TOTAL DIRECT COSTS		**1.481.283**	**169.597**		**612.673**		**524.157**		**22.228**		**152.627**	
1	**DIRECT COSTS OF HUMAN LABOUR**	**333.909**	**47.081**		**146.920**		**86.816**		**9.016**		**44.076**	
2	Direct costs of human labour	333.909	47.081		146.920		86.816		9.016		44.076	
3	**DIRECT COSTS OF MATERIAL/SERVICES**	**1.147.374**	**122.516**		**465.753**		**437.341**		**13.212**		**108.551**	
4	Raw material	997.507	109.027		412.569		369.177		11.671		95.062	
5	Outsourced services	50.050	0		0		50.050		0		0	
6	Other costs	99.817	13.489		53.185		18.114		1.542		13.489	
TOTAL GENERAL COSTS		**950.732**	**108.853**		**393.232**		**336.420**		**14.267**		**97.961**	
7	**GENERAL COSTS**	**74.873**	**8.572**		**30.968**		**26.494**		**1.124**		**7.715**	
8	Services	49.540	5.672	11,4%	20.490	41,4%	17.530	35,4%	743	1,5%	5.104	10,3%
9	Costs for personal (own) purposes	25.333	2.900	11,4%	10.478	41,4%	8.964	35,4%	380	1,5%	2.610	10,3%
10	**MACHINERY**	**845.769**	**96.835**		**349.818**		**299.278**		**12.692**		**87.146**	
11	Energy	155.647	17.821	11,4%	64.377	41,4%	55.076	35,4%	2.336	1,5%	16.037	10,3%
12	Spare parts	49.430	5.659	11,4%	20.445	41,4%	17.491	35,4%	742	1,5%	5.093	10,3%
13	Depreciation	640.692	73.355	11,4%	264.997	41,4%	226.711	35,4%	9.614	1,5%	66.015	10,3%
14	**DEPRECIATION OF BUILDINGS**	**30.090**	**3.445**		**12.446**		**10.647**		**452**		**3.100**	
15	Storage houses	30.090	3.445	11,4%	12.446	41,4%	10.647	35,4%	452	1,5%	3.100	10,3%
TOTAL COSTS		**2.432.015**	**278.450**		**1.005.905**		**860.576**		**36.495**		**250.588**	
REVENUES												
16	Revenues from grants	460.200	54.250		213.900		131.600		6.200		54.250	
17	Revenues from sales	2.731.397	319.994		1.066.657		1.014.676		41.119		288.951	
18	Other revenues	0	0		0		0		0		0	
TOTAL REVENUES		**3.191.597**	**374.244**		**1.280.557**		**1.146.276**		**47.319**		**343.201**	
PRODUCTION ECONOMICS												
19	Produced in kg		*350.000*		*938.400*		*3.431.000*		*14.400*		*133.000*	
20	**Cost of production (kn/kg)**		**0,80**		**1,07**		**0,25**		**2,53**		**1,88**	
21	**Revenue per unit (kn/kg)**		**1,07**		**1,36**		**0,33**		**3,29**		**2,58**	
22	**Profit per unit (kn/kg)**		**0,27**		**0,29**		**0,08**		**0,75**		**0,70**	
Profit per agricultural culture (kn)		**759.582**	**95.794**		**274.651**		**285.700**		**10.824**		**92.613**	

Source: Financial documentation of a small family farm business in Vukovar-Syrmia County, Croatia

Table 3 *Agricultural production economics (ABC method) – driver: working hours of machinery*

	REVENUES/EXPENSES		Corn		Wheat		Beet		Soy		Sunflower	
		ha / culture:	35		138		47		4		35	
		In HRK	In HRK	%	In HRK	%	In HRK		In HRK	In HRK	%	In HRK
EXPENSES												
TOTAL DIRECT COSTS		**1.481.283**	**169.597**		**612.673**		**524.157**		**22.228**		**152.627**	
1	**DIRECT COSTS OF HUMAN LABOUR**	**333.909**	**47.081**		**146.920**		**86.816**		**9.016**		**44.076**	
2	Direct costs of human labour	333.909	47.081		146.920		86.816		9.016		44.076	
3	**DIRECT COSTS OF MATERIAL/SERVICES**	**1.147.374**	**122.516**		**465.753**		**437.341**		**13.212**		**108.551**	
4	Raw material	997.507	109.027		412.569		369.177		11.671		95.062	
5	Outsourced services	50.050	0		0		50.050		0		0	
6	Other costs	99.817	13.489		53.185		18.114		1.542		13.489	
TOTAL GENERAL COSTS		**950.732**	**173.101**		**443.924**		**127.842**		**42.139**		**163.726**	
7	**GENERAL COSTS**	**74.873**	**10.550**		**32.529**		**20.073**		**1.982**		**9.739**	
8	Services	49.540	6.981	14,1%	21.523	43,4%	13.281	26,8%	1.311	2,6%	6.444	13,0%
9	Costs for personal (own) purposes	25.333	3.570	14,1%	11.006	43,4%	6.792	26,8%	670	2,6%	3.295	13,0%
10	**MACHINERY**	**845.769**	**161.930**		**386.000**		**106.937**		**37.536**		**153.366**	
11	Energy	155.647	21.033		82.931		28.245		2.404		21.033	
12	Spare parts	49.430	6.680		26.337		8.970		763		6.680	
13	Depreciation	640.692	134.217		276.731		69.722		34.369		125.653	
14	**DEPRECIATION OF BUILDINGS**	**30.090**	**620**		**25.396**		**833**		**2.621**		**620**	
15	Storage houses	30.090	620		25.396		833		2.621		620	
TOTAL COSTS		**2.432.015**	**342.698**		**1.056.597**		**651.999**		**64.367**		**316.353**	
REVENUES												
16	Revenues from grants	460.200	54.250		213.900		131.600		6.200		54.250	
17	Revenues from sales	2.731.397	319.994		1.066.657		1.014.676		41.119		288.951	
18	Other revenues	0	0		0		0		0		0	
TOTAL REVENUES		**3.191.597**	**374.244**		**1.280.557**		**1.146.276**		**47.319**		**343.201**	
PRODUCTION ECONOMICS												
19	Produced in kg		*350.000*		*938.400*		*3.431.000*		*14.400*		*133.000*	
20	**Cost of production (kn/kg)**		**0,98**		**1,13**		**0,19**		**4,47**		**2,38**	
21	**Revenue per unit (kn/kg)**		**1,07**		**1,36**		**0,33**		**3,29**		**2,58**	
22	**Profit per unit (kn/kg)**		**0,09**		**0,24**		**0,14**		**-1,18**		**0,20**	
Profit per agricultural culture (kn)		**759.582**	**31.546**		**223.960**		**494.277**		**-17.048**		**26.848**	

Source: Financial documentation of a small family farm business in Vukovar-Syrmia County, Croatia

4. Volume Based Costing vs. Activity Based Costing Report

Tables 1, 2 and 3 show that calculated agricultural production economics essentially differ with the applying of different cost allocation methods (i.e. the ABC and the VBC methods). Calculations based on the VBC method illustrated in tables 1 and 2 show that production economics of all 5 agricultural cultures is cost-effective and profitable and that there is no material discrepancy between indicators illustrated in table 1 (where revenue is the driver /allocation key) and table 2 (where direct costs are the driver /allocation key).
On the other side, the applying of the ABC method resulted in materially different indicators. According to the ABC method, profitability of beet production almost doubled compared to calculations based on the VBC method, while profitability of other cultures largely deteriorated. Profitability of soy production turned negative. The major cause of such discrepancy is higher quality of the informational basis resulting from the appliance of the ABC method. In this particular case, the report on production economics based on the ABC method is more realistic and more reliable.
In both cases, costs of direct labour work, costs of outsourced services and costs of direct raw material were allocated per product (i.e. agricultural culture) in the amount of actually spent quantities. Since the majority of small family farms do not keep accurate records of assets used in the production process, by applying the VBC method (tables 1 and 2) we have assumed that all occurred costs related to agricultural machinery are indirect costs.
In this respective business case, the analysed small family farm uses 30 different pieces of agricultural machinery (e.g. tractors, harvesters, ploughs, sowing machines etc.) and it was possible to precisely calculate working hours of a piece of machinery per specific agricultural culture.
The applying of the VBC method is more suitable for a simpler business cases when a family farm produces only one or two products in smaller quantities. In the business case analysed in this paper, in which a family farm produces 5 products and uses 30 pieces of machinery in the production process, the applying of the VBC method can result in unreliable final outcomes (i.e. reports).

5. Conclusion

In an environment which generates many opportunities for small entrepreneurs to develop their businesses, determining of economics of the current business situation is of crucial importance. Preparing of quality projects also requires a quality financial analysis. Small entrepreneurs need to base their business growth on cost-effective and profitable products and services. Many small entrepreneurs in the Republic of Croatia are small family farms (OPG) and craft businesses which are obliged by the law to apply single-entry accounting. The process of calculation of production economics of a small entrepreneur applying single-entry accounting and producing more than two different products requires a high level of knowledge on techniques of single-entry and double-entry accounting, managerial accounting and financial analysis. Without applying all mentioned areas of expertise, it is not possible to exactly determine production economics. Small entrepreneurs (OPG) producing more than two products and using many different pieces of machinery in the production process cannot determine their production economics without an accurate record of used machinery. The ABC method can only be applied when there is a quality informational basis to conduct an analysis of production economics, while applying such a method crucially and positively affects the quality of the final outcome (i.e. the report on production economics/performance).
The aim of this paper is to set-up a clear methodological approach for a quality financial analysis and calculation of production economics of a small entrepreneur. It is of crucial

importance for a small entrepreneur to applythe outlined methodology before making any important investment/strategic decision and before applying for EU funding.

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