

OPTIMAL FLOCK STRUCTURE OF PIG FARM PROVIDING MINIMUM COSTS

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Abstract

The study deals with the analysis of production costs, as well as the net area in the production of the herd of organizational structures at the pig farm. The question arises of the optimum production structure in the cooperative household, which is mainly oriented to the production of Pigmeat. In this paper, a concrete model of linear programming for the optimal organizational structure of the herd of pig farms of the net effective area was defined. The research covered the cooperative farm "1.Decembr" in Žitorađa in Toplički district. For 2013, the production technology of agricultural animals was followed, and economic results were analyzed. In the observed period of one year: It was found that there were 28,252 throats on the farm. Total agricultural growth in 2013 amounted to 664,920 kg, in the amount of 781,569.7 €. Total death: piglets on wolves 6,315 throats, stuffed pigs 3,425 throats, 17,150 kg, tooth 928 throats, 40,980 kg, pigs 67 throats 13,930 kg, immature 3 throat 890 kg

Key words: *crop rotation, surface area by throat, increment, death, minimum costs*

JEL: *Q12, Q13*

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Introduction

Regardless of the market-oriented pig production, it is very difficult to provide a detailed insight into the poultry farm's turnover in pig production, which is the basis of the research in the work and proving its net effective surface area of the main structure in the production process. (Andrić, 1998; Mičić et al., 2016a) find that with the increase in the number of deciduous piglets by sows from 10 to 20 heads of pigs, the price of piglet is reduced by 79.09%, while the costs of sows increase by 11.67% per year. (Džinić et al., 2003; Petrović et al., 2010; Mičić, 2014) states that the improvement of the genetic basis of pigs is an indispensable prerequisite for achieving the highest intensity in this branch of livestock production. (Petrović et al., 2010; Vidovic et al., 2012) state that the annual genetic progress for daily gain was 8-11 g, for food conversion between 0.03 and 0.05 kg, as well as 0.35 - 1.00% for meat content in Hemispheres. (Tomović et al., 2005; Mičić et al., 2016b) find that in the foreseeable future, on the basis of previous research and results in practice, there are opinions that the production of freight can be expected to have much better results as well: The framework organizational structure should move within the following limits : Piglets 20-25%, breeding fowls 5-8%, fattening pigs 70-80%, sows 4-8% and non-fennel 0,3-5%. (Radovic, 2002; Rajić, 2003; Mičić et al., 2016b) state that the next space is planned for an individual of certain categories: piglets on cheese 0,4 m², breeding pig 0,7 m², pig fodder 1,2 m², sowers 1,5 m² and nests 1,8 m². The costs of certain categories of holding are as follows: for a pig 700 dinars, piglets for breeding (breeding subspecies) 1,800 dinars, pig meat 3,500 dinars, sowers 5,000 dinars and non-salty 4,000 dinars. The same author states that "The specificity of livestock production is conditioned by the fact that in addition to the final line of livestock production (" final categories "), there are several other categories. There are two possible variants in defining livestock variables. The first implies that each category of livestock represents a separate activity and is expressed by a physical or conditional number of throats, While the second variant predicts that in the model only the final category of a particular livestock is figured, and that the necessary inputs and predicted outputs of the accompanying categories cumulatively point out through the final category. (Živković, Perunović, 2012; Petrović et al., 2013; Zekić et al., 2013; Mičić et al., 2016a) They conclude that studies related to the economic parameters of pig production are related to costs in the first stage of the production process and the determination of the total costs of individual categories of pigs they hold using the optimal organizational structure of rotation of crops on the farm, which provides minimal costs.

The aim of the research

In proofing and research, a scientific method was first used, whose application allows to explain and predict the relationship between certain relevant inputs and the results of the achieved effects in the production of pigs. In accordance with the strategy of developing the production of fatteners, the aim of the research is to increase the quality of production in pig breeding with the highest number of analyzed and realized

economic parameters, originating from noble pure breeds, which are grown on farms in Serbia. When creating this work, data from multiple sources was used. These are the quantities of production, analysis of pig production for a longer period of time. The analysis of such data alone would not be possible if it was not approved by the farm, and the data were further processed by math-statistical methods.

Material and methods

The research covered the cooperative agricultural farm “1 December” in **Žitorada**. The said farm has a closed production cycle that includes the production of fattening pigs. The farm produced 28,829 piglets in 2013. In 2013, 75 persons with appropriate qualifications were employed in the farm. Costs in the production of farm animals on the farm are based on natural indicators determined on the basis of the investigations carried out in 2013. Costs are covered on the basis of the norms of the required space and equipment, approach to the estimation of depreciation costs, on the basis of which the categories of fixed costs are calculated. When determining the surface of a pig, it starts from an independent variable. For conclusions, farm production parameters, costs, increment, total increase and mortality were monitored. The significance of the results of the research in the production of fattening pigs were monitored independently on the farm in 2013.

Results and Discussion

The strategy of pig production, within the scope of research, was analyzed at the farm:

- Planting herds on the farm in 2013,
- Limitations: Accommodation capacities, organizational structure of herds on the farm,
- Criteria Function: Minimum Farm Costs.

In addition to theoretical explanation and application on the general examples, the efficiency of the optimal surface on the case of fattening pigs in 2013 on the farm was also shown. The costs of pig production on the farm are based on natural indicators.

In the cooperative household, the calculation of costs was made in accordance with the production processes. Costs also relate to the process of production, space and equipment that is carried out on the basis of norms.

Plantation of a herd on a pig farm “1.Decenbar “in Zitoradza in 2013

For the pig farming on the farm, the price of all products is taken into account. More information on this is shown in (Tables 1,3,5,7,9 and 11,). The entry status of all categories of pigs for the period from 01.01.to 31.12. 2013.is shown.

Table 2,4,6,8,10 and 12 show the output status of all types of pigs for the period until 31 December 2013.

Table 1. Input condition

No.	category livestock	Admission for the period from 01.01. to 31. 12. 2013						
		Balance at the beginning years		Translated			all	
		Who	kg	from the group	Who	kg	Who	kg
1	2	3	4	5	7	8	9	10
1.	Prasad			Pigs	7132			
2.	suckling			from breeding sows	657			
3.	Boars			from breeding boars	4			
4.	pigs	7.132		from weaning piglets	27649		35442	

Source: Authors' calculation based on data from Mičić, 2013

Table 2. Output status

Output for the period until 31 12 2013										
Translated	slaughtered		died		Sold		Balance at end of year		all	Growth in kg 23-15
a group	Who	kg	Who	kg	Who	kg	Who	kg	kg	
14	15	16	17	18	19	20	21	22	23	24
prefattening										
extracted sows	186	36720			475	107634				
fatling	6983	195080	982	40980	18570	1960320	7568			
internal realization	682	68200								
pigs							35442	2354934	3019854	664920

Source: Authors' calculation based on data from Mičić, 2013

Table 3. Input condition

No.	category livestock	Admission for the period from 01.01. to 31. 12. 2013							
		Balance at the beginning years		Amount	Translated			all	
		Who	kg	Rsd	from the group	Who	kg	Who	kg
1	2	3	4	5	6	7	8	9	10
1.	Prasad suckling				pigs				
2.	pigs1.1.13.	2858	8574	1243230	Prasad				
3.	Oprihodovano	37642						40500	8574
	In total	40500	8574	1243230					

Source: Authors' calculation based on data from Mičić, 2013

Table 4. Output status

Output for the period until 31 12 2013												
Translated			slaughtered		Died		Sold		Balance at end of year		all	Growth in kg 23-15
a group	Who	kg	Who	kg	Who	kg	Who	kg	Who	kg	rsd	
12	13	14	15	16	17	18	19	20	21	22	23	24
In weaned piglets	31308	156540			6315						22698300	
pigs 31.12.13									2877	8631	1251495	
In total									40500	165171	23949795	
State 1.1.13									40500	8574	1243230	156597
Growth									-	156597	22706565	

Source: Authors' calculation based on data from Mičić, 2013

Table 5. Input condition

No.	category livestock	Admission for the period from 01.01. to 31. 12. 2013							
		Balance at the beginningyears				Balance at the beginningyears			
		Who		Who		Who		Who	
1	2	3	4	5	6	7	8	9	10
	weaned piglets								
1.	pigs 1.1.13.	4371	65565	9506925	Прасад				
2.	Translated piglets	31308	156540	22698300				35679	222105
3.	In total	35679	222105	32205225					

Source: Authors' calculation based on data from Mičić, 2013

Table 6. Output status

Output for the period until 31 12 2013												
Translated			slaughtered		Died		Sold		Balance at end of year		all	Growth in kg 23-15
a group	Who	kg	Who	kg	Who	kg	Who	kg	Who	kg	rsd	
12	13	14	15	16	17	18	19	20	21	22	23	24
Prasad fattening	27649	552980			3425	17125					80182100	
pigs 31.12.13									4605	73680	10683600	
In total									35679	643785	90865700	
State 1.1.13									35679	222105	32205225	421680
Growth									-	421680	58660475	

Source: Authors' calculation based on data from Mičić, 2013

Table 7. Input state

No.	Category Livestock	Entrance for the period from 01.01.2013							
		Stanjena Beginning years		Amount	Translated			Everything	
		Who	kg	Rsd	from the group	Who	kg	Who	kg
1	2	3	4	5	6	7	8	9	10
	Breeding gilts				Pigs				
1.	Pigs 01.01.2013.	560	73920	10718400					
2.	Translated from the site	682	68200	9889000				1242	142120
3.	In total	1242	142120	20607400					

Source: Authors' calculation based on data from Mičić, 2013

Table 8. Output status

Output for the period until 31 12 2013												
Translated			Slaughtered		Died		Sold		Balance at the end of the year		Everything Amount	Growth In kg 23-13
a group	Who	kg	Who	kg	Who	kg	Who	kg	Who	kg	rsd	
12	13	14	15	16	17	18	19	20	21	22	23	24
Sows	781	117150									16986750	
Pigs 31.12.13									461	58335	8458575	
In total									1242	175485	25445325	
Pigs 01.01.13									1242	142120	20607400	33365
Growth									-	33365	4837925	

Source: Authors' calculation based on data from Mičić, 2013

Table 9. Input state

No.	Category Livestock	Entrance for the period from 01.01.2013							
		Stanjena Beginning years		Amount	Translated			Everything	
		Who	kg	Rsd	From the group	Who	kg	Who	kg
1	2	3	4	5	6	7	8	9	10
	Breeding sows				Pigs				
1.	Pigs 01.01.13.	1534	268450	38925250					
2.	Translated	781	117150	16986750				2315	385600
3.	In total	2315	385600	55912000					

Source: Authors' calculation based on data from Mičić, 2013

Table 10. Output status

Output for the period until 31 12 2013												
Translated			Slaughtered		Died		Sold		Balance at the end of the year		Everything Amount	Growth In kg 23-13
a group	Who	kg	Who	kg	Who	kg	Who	kg	Who	kg	rsd	
12	13	14	15	16	17	18	19	20	21	22	23	24
Sows	657	144354									20931330	
Sows					67	13930					2019850	
Pigs 31.12.13									1591	278425	40371625	
In total									2315	436709	63322805	
Pigs 01.01.13									2315	385600	55912000	51109
Growth									-	51109	7410805	

Source: Authors' calculation based on data from Mičić, 2013

Table 11. Input state

No.	Category Livestock	Entrance for the period from 01.01.2013							
		Stanjena Beginning years		Amount	Translated			Everything	
		Who	kg	Rsd	From the group	Who	kg	Who	kg
1	2	3	4	5	6	7	8	9	10
	Breeding nerves				Pigs				
1.	Pigs 1.1.13.	35	7770	1243200					
2.	Purchased nerves	6	771	253704				41	8541
3.	In total	41	8541	1380354					

Source: Authors' calculation based on data from Mičić, 2013

Table 12. Output status

Output for the period until 31 12 2013												
Translated			Slaughtered		Died		Sold		Balance at the end of the year		Everything Amount	Growth In kg 23-13
a group	Who	kg	Who	kg	Who	kg	Who	kg	Who	kg	rsd	
12	13	14	15	16	17	18	19	20	21	22	23	24
Unruly	4	1320									191400	
Unruly					3	890					129050	
Pigs 31.12.2013									34	8500	1232500	
In total									41	10710	1552950	
Pigs 01.01.2013									41	8541	1380354	2169
Growth									-	2169	172596	

Source: Authors' calculation based on data from Mičić, 2013

Note: Table 1,3,5,7,9 and 11 shows the entry status of all types of pigs for the period from 01.01 to 31.12.2013. Table 2,4,6,8,10 and 12 show the output status of all types of pigs for the period until 31 December 2013.

Table 13. Livestock income on farm for 2013.

Category of livestock	Kg	Amount (€)
Piglets on cheese	156.597	189.221,4
Closed piglets	421.680	488.837,3
Breeding gilts	33.365	40.316,0
Breeding sows	51.109	61.756,7
Breeding nerves	2.169	1.438,3
Total increase	664.920	781.569,7

Source: Authors' calculation based on data from Mičić, 2013

Table 14. Will end up at the farm for 2013.

January-December	Piglets on cheese	Closed piglets		Running pigs		Breeding sows		Breeding nerves	
Moon	Who	Who	kg	Who	kg	Who	kg	Who	kg
I	515	270	5	141	6140	7	1490		
II	510	280	5	106	4750	4	850		
III	550	290	5	118	4570	4	860		
IV	540	280	5	79	3300	5	1070	3	890
January-December	Piglets on cheese	Closed piglets		Running pigs		Breeding sows		Breeding nerves	
Moon	Who	Who	kg	Who	kg	Who	kg	Who	kg

V	520	320	5	84	3420	3	630		
VI	540	285	5	67	2760	6	1230		
VII	510	290	5	64	2670	10	2040		
VIII	510	285	5	50	2140	7	1420		
IX	540	300	5	63	2590	3	630		
X	540	285	5	64	2690	6	1200		
XI	530	270	5	69	2960	5	1020		
XII	510	270	5	77	2990	7	1490		
In total	6.315	3.425	17.150	982	40.980	67	13.930	3	890

Source: Authors' calculation based on data from Mičić, 2013

Note: Table 13 shows the increase in livestock of all types of pigs for the period from 01/01/2013 to 31/12/2013, and in Table 14, the cattle will die in the farm in 2013

Setting a model to solve a defined problem

When setting the model, we first define the production lines that take into account to enter the optimal production structure.

In the model model, it starts from the assumption that in the selected livestock capacities the optimal organizational structure of the flock of a pig farmer's net effective area of 12 000 m², by linear programming, is determined.

The organizational structure should be framed within the following limits:

- Piglets 20-25%
- Breeding subspecies 5-8%
- Fattening pigs 70-80%
- Sows 4-8% i
- Unbreakable 0,3-5%.

The following space is planned for the individual of certain categories: piglets on cheese 0,4 m², breeding pig 0,7 m², pig fodder 1,2 m², sowers 1,5 m² and nests 1,8 m².

The costs of individual holding categories are as follows:

For a piglet 700 dinars, piglets for breeding (breeding subspecies) 1,800 dinars, pig meat 3,500 dinars, sowers 5,000 dinars and non-dinner 4,000 dinars.

In our case, it is defined through the number of livestock category cattle, accommodation capacities, organizational structure of herds and direct costs per unit of capacity.

In solving the model, it is necessary to define the economic function of the criteria.

1. Independent variable:

X_i - number of livestock category cattle "and"

I = 1 (1) 5 - cattle categories

I = 1 - piglets

I = 2 - breeding subspecies

I = 3 - fattening pigs

I = 4 - sows

I = 5 - unbreakable

2. Limitations:

a) Accommodation capacities

$$0,4 \text{ m}^2 / \text{throat } X_1 (\text{throat}) + 0,7 X_2 + 1,2 X_3 + 1,5 X_4 + 1,8 X_5 = 12,000 \text{ m}^2$$

b) Organizational structure of the herd

$$X_1 > 0,20 (X_1 + X_2 + X_3 + X_4 + X_5); 0,80 X_1 - 0,20 (X_2 + X_3 + X_4 + X_5) > 0$$

$$X_1 < 0,25 (X_1 + X_2 + X_3 + X_4 + X_5); 0,75 X_1 - 0,25 (X_2 + X_3 + X_4 + X_5) < 0$$

$$X_2 > 0,05 (X_1 + X_2 + X_3 + X_4 + X_5); 0,95 X_2 - 0,05 (X_1 + X_3 + X_4 + X_5) > 0$$

$$X_2 < 0,08 (X_1 + X_2 + X_3 + X_4 + X_5); 0,92 X_2 - 0,08 (X_1 + X_3 + X_4 + X_5) < 0$$

$$X_3 > 0,7 (X_1 + X_2 + X_3 + X_4 + X_5); 0,3 X_3 - 0,7 (X_1 + X_2 + X_4 + X_5) > 0$$

$$X_3 < 0,8 (X_1 + X_2 + X_3 + X_4 + X_5); 0,2 X_3 - 0,8 (X_1 + X_2 + X_4 + X_5) < 0$$

$$X_4 > 0,04 (X_1 + X_2 + X_3 + X_4 + X_5); 0,96 X_4 - 0,04 (X_1 + X_2 + X_3 + X_5) > 0$$

$$X_4 < 0,08 (X_1 + X_2 + X_3 + X_4 + X_5); 0,92 X_4 - 0,08 (X_1 + X_2 + X_3 + X_5) < 0$$

$$X_5 > 0,003 (X_1 + X_2 + X_3 + X_4 + X_5); 0,997 X_5 - 0,003 (X_1 + X_2 + X_3 + X_4) > 0$$

$$X_5 < 0,05 (X_1 + X_2 + X_3 + X_4 + X_5); 0,95 X_5 - 0,05 (X_1 + X_2 + X_3 + X_4) < 0$$

3. Function of criteria:

Minimum expenses

$$700 \text{ din} / \text{throat } X_1 (\text{throat}) + 1,800 X_2 + 3,500 X_3 + 5,000 X_4 + 4,000 X_5 \\ = V (\text{min})$$

In setting up the model of the optimal structure of the household, one of the most important issues is defining the factors over the corresponding ones which will, through the linear programming model, essentially influence the flow of the solution and the selection of the structure of pig production.

Projection of the optimization of the structure of pig production is based on the achieved

average production and economic results in order to compare the projected and actual production structure and economic results.

Task solution:

MIN

$$700X_1 + 1800X_2 + 3500X_3 + 5000X_4 + 4000X_5$$

SUBJECT TO

$$0.4X_1 + 0.7X_2 + 1.2X_3 + 1.5X_4 + 1.8X_5 = 12000$$

$$0.80X_1 - 0.20X_2 - 0.20X_3 - 0.20X_4 - 0.20X_5 > 0$$

$$0.75X_1 - 0.25X_2 - 0.25X_3 - 0.25X_4 - 0.25X_5 < 0$$

$$0.95X_2 - 0.05X_1 - 0.05X_3 - 0.05X_4 - 0.05X_5 > 0$$

$$0.92X_2 - 0.08X_1 - 0.08X_3 - 0.08X_4 - 0.08X_5 < 0$$

$$0.3X_3 - 0.7X_1 - 0.7X_2 - 0.7X_4 - 0.7X_5 > 0$$

$$0.2X_3 - 0.8X_1 - 0.8X_2 - 0.8X_4 - 0.8X_5 < 0$$

$$0.96X_4 - 0.04X_1 - 0.04X_2 - 0.04X_3 - 0.04X_5 > 0$$

$$0.92X_4 - 0.08X_1 - 0.08X_2 - 0.08X_3 - 0.08X_5 < 0$$

$$0.997 X_5 - 0.003X_1 - 0.003X_2 - 0.003X_3 - 0.003X_4 > 0$$

$$0.95X_5 - 0.05X_1 - 0.05X_2 - 0.05X_3 - 0.05X_4 < 0$$

END

LP OPTIMUM FOUND AT STEP 6

OBJECTIVE FUNCTION VALUE

0.2575503E+08

VARIABLE	VALUE	REDUCED COST
X1	2516.778564	0.000000
X2	335.570465	0.000000
X3	5033.557129	0.000000
X4	419.463074	0.000000
X5	83.892616	0.000000

ROW SLACK OR SURPLUS DUAL PRICES

2)	0.000000	-2575.503418
3)	419.463074	0.000000
4)	0.000000	427.348999
5)	83.892616	0.000000
6)	83.892616	0.000000
7)	0.000000	-197.147644
8)	838.926147	0.000000
9)	0.000000	-1424.496704
10)	2516.778564	0.000000
11)	41.946312	0.000000
12)	0.000000	90.604027

RANGES IN WHICH THE BASIS IS UNCHANGED:

OBJ COEFFICIENT RANGES

VARIABLE	CURRENT	ALLOWABLE	ALLOWABLE
	COEF	INCREASE	DECREASE
X1	800.000000	397.347900	300.000000
X2	2000.000000	192.622940	87.096779
X3	4000.000000	2830.000000	150.000000
X4	6000.000000	6714.285645	1486.865234
X5	5000.000000	91.525421	INFINITY

RIGHTHAND SIDE RANGES

ROW	CURRENT	ALLOWABLE	ALLOWABLE
	RHS	INCREASE	DECREASE
2	10000.000000	INFINITY	9999.999023
3	0.000000	419.463074	INFINITY
4	0.000000	84.104294	83.682007
5	0.000000	83.892616	INFINITY
6	0.000000	INFINITY	83.892616

7	0.000000	83.402832	84.388184
8	0.000000	INFINITY	838.926147
9	0.000000	83.194679	84.602364
10	0.000000	INFINITY	2516.778564
11	0.000000	41.946312	INFINITY
12	0.000000	83.056480	42.158520

Conclusion

Based on the analysis of the situation in the production and the optimal organizational structure of the livestock farm, which ensures minimal costs in the amount of 25,755,000 dinars, the following structure of the herd has been achieved: 2.517 heads of pigs, 336 seeds of juvenile breeding, pigs 5.034 heads, 419 sows and nerazoles 84 throats. Total deaths on the farm in 2013 were: pigs on cheese 6,315 heads, 3,425 heads, 17,150 kg pigs, 988 heads, 40,980 kg pigs, 67 seeds, 13,930 kg breeders and 890 kg of unadjusted 3 heads. The total increase in livestock per farm for the first year is 664.920 kg, from 781.569,7 EUR. Another argument in the request for determining the costs of pig production according to the meat share, which was shown in the farm's research, is that it is best to close the entire production cycle. This is primarily the market for fattening pigs, piglets and pig meat in Serbia in 2013. After the research, a number of very important questions were answered in the paper: the level of costs is not such as to stimulate pig farmers, and the price affects the volume of production. Consumption of pork is cyclically reduced due to relatively high prices and a decline in living standards in the Republic of Serbia. The new scientific findings in pig breeding have come to light, the advantages of this method of training have been examined and scientific contribution has been given to the improvement of the development of pig production, for which Serbia, along with pig breeding tradition, has excellent geographical ecological potentials. As the final conclusion of these studies, pig farms may be recommended to be organized into production groups, co-operatives, clusters or franchisees (franchisees) or franchisees (franchises) to be able to place their products at higher prices. The basis for achieving better production results is a change in the type of production, meals, facilities, mechanization of work processes, farm size, intensity, rational management of costs in farm conditions. Because of their specificity, primarily biological character, each line of agricultural production must be viewed and organized as a complex process composed of a number of elements having one goal, namely achieving as good a result as possible with a lower investment unit. In Serbian swineyard, there is a traditionalism that needs to undergo fundamental changes in order to achieve the desired results. Such results can be achieved only in the case of the establishment of a fully functional closed system of breeding. There is a traditionalism in Serbian swine that needs to go through fundamental changes in order to achieve the desired results. Such results can be achieved only in the case of the establishment of a fully functional closed herd breeding system.

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OPTIMALNA STRUKTURA SVINJA NA FARMI SA MINIMALNIM PROIZVODNIM TROŠKOVIMA

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Rezime

Studija se bavi analizom obrta stada svinjogojске farme u proizvodnji svinjskog mesa u Srbiji, kao i neto efektivne površine oprimalne organizacione structure tovljenika u farmskim uslovima. Postavlja se pitanje optimalne structure proizvodnje na zadružnom gazdinstvu, koja je uglavnom orijentisano na proizvodnji tovnih svinja. U

radu je definisan i urađen konkretan model linearnog programiranja za optimalnu organizacionu strukturu stada svinjarske farme neto efektivne površin., Istraživanje je obuhvatilo zadružnu farmu „1. Decembr“ u Žitorađi u Topličkom okrugu. Za 2013 godinu praćena je tehnologija proizvodnje tovljenika na farmi, i analizirani su ekonomski rezultati. Tokom jednogodišnjeg posmatranog perioda. Utvrđeno je da je na farmi uzgoj tovljenika bio je 28.252 grla. Ukupni prirast na farmi, u 2013. godini bio je 664.920 kg, u iznosu od 781.569,7 €. Ukupno uginuće: prasadi na sisi 6.315 grla, zalućena prasad 3.425 grla, 17.150 kg, tovnih svinja 928 grla, 40.980 kg, krmaće 67 grla 13.930 kg, nerastova 3 grla 890 kg.

Ključne reći: obrt stada, površine po grlu, prirast, uginuće, minimalni troškovi

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