

## ECONOMICS AND MANAGEMENT IN HOG RAISING

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*SUMMARY: In the cattle raising, hog raising is one of the largest and the most important parts. Hog raising is of great importance for Serbia, especially in regions with favorable conditions for the production of corn as the main food for pigs. By analyzing the number of pigs in ten-year period, it can be established that the average number of pigs in the Republic of Serbia was 3,497,000.00 ranged from 3,165,000.00 to 3,832,000.00, with a tendency of decrease of 10,000 pigs per year. The average number of sows and pregnant gilts was  $714,600.00 \pm 74,730$ , a first-degree equations true indicates that the average annual reduction in the number of animals was 22,850. Analyzing price movements of pigs in the period 2001 – 2011, we conclude that the price was on average  $1.86 \pm 0.39$  Euros, the average price of pigs being fattened in the same period was  $1.32 \pm 0.28$  Euros, and price of maize was  $0.13 \pm 0.05$  Euros. Analyzing the relationship between corn price and piglets price we get ( $r_{xy} = -0.45$ ) negative and low correlation coefficient, which indicates a small negative dependence of the price of piglets due to the change of the corn price. The effect of the corn price on the price of the pigs being fattened is almost negligible ( $r_{xy} = 0.11$ ). Slightly larger and positive impact has the change in the price of pigs being fattened on increasing the price of piglets ( $r_{xy} = 0.59$ ).*

**Key words:** pigs, economics, trends, production results.

### INTRODUCTION

General characteristics of livestock production are very complex, if one takes into account the diversity of the most important factors that may affect production. Number of factors affecting livestock production is large and diverse, which make this production more complicated than farming. In the production of livestock, pig production is one of the largest and most important parts. Hog raising, as economic activity, always

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Original scientific paper / Originalni naučni rad

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had great importance in the economic development of a country. Pig production is of great importance for Serbia, especially in regions with favorable conditions for the production of corn as the main feed for pigs (Todorović et al., 2002). Production capacity of pigs, which are manifested in the rapid growth, high fertility and good feed utilization, is comparative advantages that ensure high participation and importance of hog raising in the development of agriculture. The pig has significant biological characteristics that differentiate it from other domestic animals, which have a significant impact on the cost of production and thus make it the most profitable livestock (Antić, 2001). The pig is very fertile animal (over ten piglets per litter), the normal parturient process is taking place at least twice a year, pigs rapidly grow and thrive, pigs achieved physiological and physical maturity at the age of 5-8 months, and with less than a year gives the first offspring (Tešić et al., 2002) The fattening of less than three pounds of food gives one kilogram of gain. Under modern conditions of cultivation, the productivity of pigs now reached a level which until recently was considered to be biologically limited. Per sow per year today, it is possible to get 26 pigs, 1800kg and 2000 kg of live weight, 1450 to 1620 halves and up to 900 kg - 1010 kg of meat. The number of fattening pigs per sow per year reaches 25.

## **MATERIALS AND METHOD**

The aim of this study were, in addition to focus to present state of pig production in Serbia in the period 2001 - 2011., economic indicators that show pig production in the same period.

In the first part of this study, we used the statistical data related to the number of pigs in the Republic of Serbia in the period 2001 - 2011. All data are sorted by categories: total number of pigs, piglets, fattening pigs, sows and gilts, boars, breeding, mortality, growth and production of meat and fat. For these data, we calculated descriptive statistical parameters (arithmetic mean, standard deviation, standard error, coefficient of variation and the variation interval. Tendency of the observed parameters, we calculate based on the equation of a straight line. Opting for the best-adjusted line we were performing based on the size of the Pearson correlation coefficient.

In the second part, based on data from the Commodity Exchange in Novi Sad and the ten-year follow-up of production-economic indicators on a farm we calculated the mutual relationship of the main indicators of economic pig production. In the economic analysis of the results, we used the following parameters: the market price of piglets, market price of animals being fattened, the price of corn, euro exchange rate and the price of complete feed mixtures for fattening. All these data were collected on a monthly basis in the period 2001 - 2011. In our analysis, we first calculated the descriptive statistical parameters, followed by regression and correlation analysis we determined relationship and the impact of these factors. Production efficiency was determined based on the cost of weight gain and the market price of hogs.

## **RESULTS**

Analyzing the number of pigs in the ten-year research period, it can be determined that the average number of pigs in the Republic of Serbia ranged from 3,497,000.00

with variation of 3,165,000.00 up to 3,832,000.00 and 5.82% coefficient of variation, indicating that there was not a large variation in the total number of pigs in the study period (Table 1). The tendency of pigs flow has negative flow with an average annual reduction of 10,160 animals, which explains the equations of the first degree ( $Y = 3.558\ 000 - 10.160x_i$ ) (Fig. 1) (Petrović et. al., 2005). Based on the data, it is determined that the average number of piglets during the study period was  $1,118,000.00 \pm 171,700.00$  heads, and the number of pigs being fattened ranged from 1.201.000 in 2005, up to 1.775.000 in 2009, with the average number of  $1,475,000 \pm 208,500$  heads. In an analysis of trends and developments in the number of piglets and the number of pigs being fattened, a positive trend with an average annual increase of 37,830 heads and pigs being fattened of 48,050 was noticed. Quantity of breeding animals (gilts and sows, boars) in the study period was very low with a tendency to fall (Popović et.al., 2010). The average number of sows and pregnant gilts was  $714,600.00 \pm 74,730$ , and the equation of the straight line indicates that the average annual reduction in the number of heads was 22,850. The situation regarding breeding boars includes average number of 33,670 heads, with an annual reduction of 3166 heads.

Table 1: Descriptive statistical parameters of the number of pigs in the Republic of Serbia (in thousands of heads)

	$\bar{X}$	SD	Sx	Min.	Max.	CV
Total	3497,00	203,70	61,4100	3165,00	3832,00	5,82
Piglets	1118,00	171,70	57,2400	926,00	1431,00	15,36
Pigs being fattened	1475,00	208,50	69,5100	1201,00	1775,00	14,14
Sows and pregnant sows	714,60	74,73	24,9100	631,00	825,00	10,46
Boars	33,67	9,87	3,2900	21,00	49,00	29,33

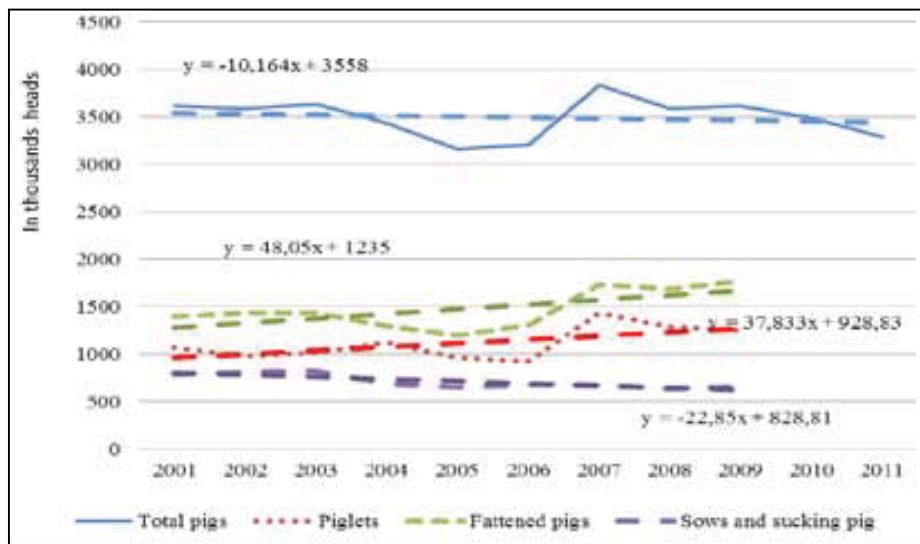


Fig. 1. The tendency of the movement the number of the pigs in the Republic of Serbia

Table 2: Descriptive statistical parameters of the production characteristic of pigs in the Republic of Serbia

	$\bar{X}$	SD	Sx	Min.	Max.	CV
breeding	7.252,0	869,40	274,9000	5.968,00	8328,00	11,99
death	803,90	145,70	46,0700	593,00	981,00	18,12
increase in numbers	429,60	27,93	8,8320	386,00	473,00	6,50
meat production	261,50	13,85	4,3800	242,00	289,00	5,30
fat production	65,80	26,62	8,4170	30,00	101,00	40,45

Using the analysis of the number of fertilized pigs, the average annual reduction in the number of fertilized pigs of 267,900 heads was established, and the average number was  $7,252,000 \pm 803,900$  heads (Table 2) (Popović et. al. 2010). Analyzing the number of fertilized pigs and the number of sows and gilts by year shows that at the annual level only  $10:33 \pm 0.29$  pigs were fertilized per breeding animal. This data refers to the intensity of pig production in the Republic of Serbia. Positive trends in pig farming show minimized mortality and decreased production of fat. The average annual mortality stood at  $803,900 \pm 145,700$ , and ranged from 593,000 in 2009, up to 981,000 in 2002, with an average annual reduction of 42,930 heads ( $Y = 1.040.000 - 42.930x$ ) (Fig. 2). Production of fat records average annual reduction in production of 8,266.60 kg.

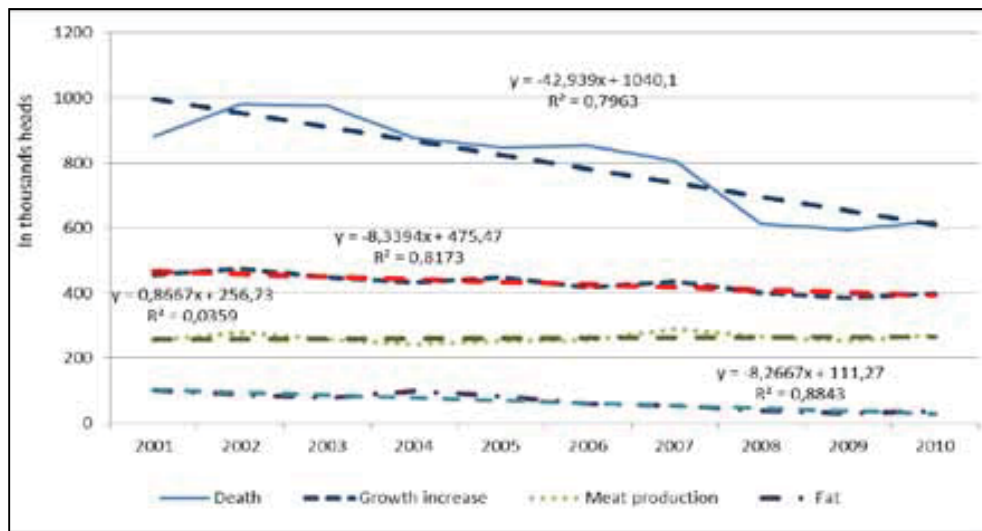


Fig. 2. The tendency of moving the characteristics of pig production in the Republic of Serbia

Table 3: Descriptive statistical parameters of the pig production indicators

Euro	$\bar{X}$	SD	Sx	Min.	Max.	CV
Piglets	1,86	0,39	0,0342	1,18	2,87	21,12
Pigs being fattened	1,32	0,28	0,0240	0,81	2,22	20,99
Corn	0,13	0,05	0,0040	0,06	0,24	34,16

Analyzing the movements of price of the pigs in the period 2001 – 2011 was established that it was an average of  $1.86 \pm 0.39$  Euros with a coefficient of variation of 21.12%. Price of piglets was 1.18 Euros in January 2004, and the highest was 2.87 Euros in November and December 2008, (Table 3). The average price of pigs being fattened in

the same period was  $1.32 \pm 0.28$  Euros, and the coefficient of variation was 20.99%. In April 2007, the purchase price of pigs being fattened was the lowest (0.81 Euro), and in September 2008, was the highest (2.22 Euros). The greatest variation has suffered the price of corn; it was 34.16%, while the average price was  $0.13 \pm 0.05$  Euros. The highest corn price was recorded in July 2011 (0.24 million), while the lowest was in October and November 2005. For the studied period, only the price of piglets has a tendency of slight decrease of 0.009 Euros per kilogram/ per annum. Prices of corn and pigs have a slight tendency to increase - the price of the corn of 0.002 Euros and pigs being fattened of about +0.012 Euros annually. This suggests that during the same period the situation was negative for producers of piglets.

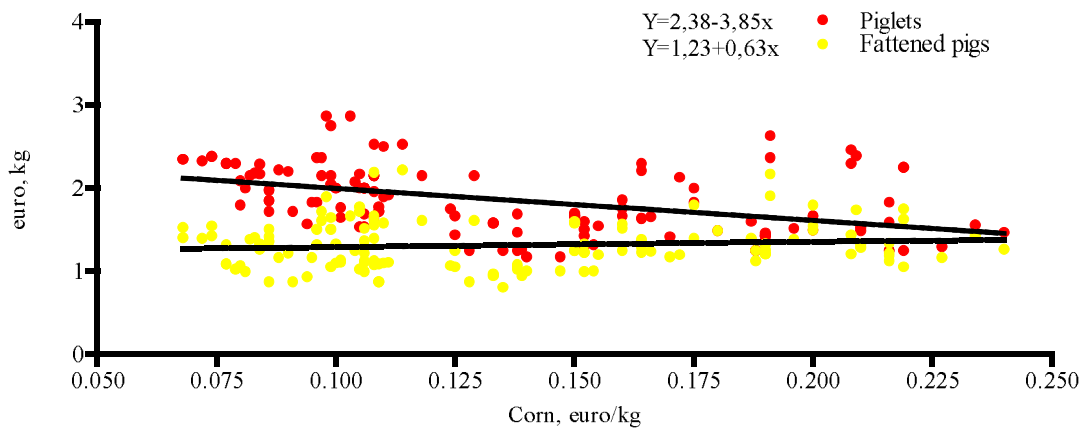


Fig. 3. Regression analysis of the price

Impact analysis of varying the price of corn as the main energy nutrients in pork production to the cost of the purchase price of piglets and fattening pigs was carried out in two directions (Mutavdžić et. al., 2007). Based on regression analysis and regression coefficients obtained can be found that with the increase in the price of corn, grows the price of pigs being fattened, while the price of piglets continually falls. This is happening because the increase in the price of corn causes a reduction in the number of pigs being fattened, purchase price of fattened pigs increases, demand for pigs for fattening decreases, thus falling price of piglets (Fig. 3). However, this would be very easy to explain we would not take into account other economic parameters (Zekić et. al., 2007). Correlation coefficient will show us the degree of dependence and the strength of connection. Analyzing the relationship between the price of corn and the price of piglets we get ( $r_{xy} = -0.45$ ), a low and negative correlation coefficient, which indicates a small and negative dependence of the price of piglets in relation to the change of the price of corn. Impact of the price of corn to the price of pigs is almost negligible ( $r_{xy} = 0.11$ ). Slightly larger and a positive impact has the change in the price of fattening pigs on increased prices of piglets ( $r_{xy} = 0.59$ ).

## DISCUSSION

Basic orientation for further development of pig should be directed to the intensification of production through the application of modern techniques of selection, genetics and reproduction, then quality nutrition and health care, which is accompanied by continuous labeling and identification of animals.

Because we have an experienced and qualified professional staff and a positive experience in the industrial hog raising, pork production in the future, in addition to the quantitative increase, must have a quality improvement, which refers to the increase of the percentage of meat in the halves (Jovanović et. al., 2009). Meaty pigs should dominate in the production programs of future farmers that can meet the high standards and refined taste of consumers, and the payment of pigs must be based on the percentage of meat in the halves according to so-called EUROP system.

In order to avoid cycles of production, which characterized the previous period, which was ruled by the spontaneous production of the individual sector, which still accounts for nearly 83% of pig production, it is necessary to increase farm production where dominant producers should have 50-100 sows (Zekić et. al., 2008). They need to deal with industrial hog raising based on the planned and organized principle of pig production and to be tied with the slaughter industry based on the contract.

## CONCLUSION

For pork production in the Republic of Serbia at the moment and with the current level of development, in order to reach production levels of some developed countries, it is necessary:

- 1) To import purebreds and their crosses with high genetic merits;
- 2) To complete the process of restructuring and privatization of large agricultural enterprises;
- 3) To set up production based on contractual relations;
- 4) To provide favorable long-term credits and investment policy for the supply of raw materials, and facilities;
- 5) To finally regulate the possibility of exporting pig meat and meat products;
- 6) To organize a joint approach by organizing associations of producers.

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## EKONOMIKA I UPRAVLJANJE U SVINJARSTVU

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### Izvod

U okviru stočarske proizvodnje proizvodnja svinja predstavlja jedan od najvećih i najznačajnijih delova. Svinjarska proizvodnja ima veliki značaj za Srbiju, a posebno za regione koji imaju povoljne uslove za proizvodnju kukuruza kao osnovnog energetskog hraniva za ishranu svinja. Analizirajući broj svinja u desetogodišnjem ispitivanom periodu može se ustanoviti da je prosečan broj svinja u R Srbiji bio 3.497.000,00 sa variranjem od 3.165.000,00 do 3.832.000,00, sa tendencijom smanjenja od 10.000 grla godišnje. Prosečan broj krmača i suprasnih nazimica bio je 714.600,00±74.730, a jednačina prave prvog stepena ukazuje da je prosečno godišnje smanjenje broja grla bilo 22.850. Analizirajući kretanje cena prasadi u periodu od 2001. do 2011. godine ustanovljava se da je ona bila prosečno 1,86±0,39 eura, prosečna cena tovljenika u istom periodu bila je 1,32±0,28 eura, a cena kukuruza bila je 0,13±0,05 eura. Analizirajući vezu između cene kukuruza i cene prasadi dobijamo ( $r_{xy} = -0,45$ ) negativan i nizak koeficijent korelacije, što ukazuje na malu i negativnu zavisnost cene prasadi u odnosu na promenu cen kukuruza. Uticaj cene kukuruza na cenu tovnih svinja gotovo je zanemarljiv ( $r_{xy} = 0,11$ ). Nešto veći i pozitivan uticaj ima promena cene tovljenika na povećanje cene prasadi ( $r_{xy} = 0,59$ ).

**Ključne reči:** svinje, ekonomika, trend, proizvodni rezultati.

Received / *Primljen*: 24.09.2012.

Accepted / *Prihvaćen*: 15.10.2012.