

## Assessing the Economic Efficiency in Some Broiler Farms through the European Production Efficiency Factor (EPEF)

ELENI MAVROMATI<sup>1</sup>

Economic Technical High School, Tirana, Albania

LUMTURI SENA

Department of Animal Production

Faculty of Agriculture and Environment

Agricultural University of Tirana, Albania

ZEF GJETA

Visiting Professor Agricultural University of Tirana, Albania

JANI MAVROMATI

Veterinary Public Health Department, Veterinary Medicine Faculty

Agricultural University of Tirana, Albania

### Abstract

*European Production Efficiency Factor (EPEF) is little known and not common in use in the broiler farms in Albania.*

*In this study are calculated the European Production Efficiency Factor in eight broiler farms, during the first half of year 2017.*

*In the 8th farms were held in details all the data and the technical indicators such as: total feed consumption, feed conversion ratio (FCR), bird mortality, daily weight gain, weight and days in slaughter house. From the above indicators through the respective formula was calculated the European Production Efficiency Factor for 8 farms and the results are respectively from farm 1 to farm 8 as following: 218.8; 280.2; 244.6; 228.7; 260.1; 253.6; 292; and 273.7. As we can see in the monitoring study, from 8th farms three of them have the European Production Efficiency Factor (EPEF) over 260. The index 260 is considered viable for a broiler farm production. In one farm*

---

<sup>1</sup> Corresponding author: [el-ma65@hotmail.com](mailto:el-ma65@hotmail.com)

*EPEF is 260.1 and in the other four farms the EPEF is less than 260, which translates that the economic profitability in these farms are low. Based on this study we conclude that broiler farms in Albania, should be monitored and calculated continuously for each broiler production the EPEF, because that gives us the opportunity to judge quickly and correctly to the production profitability of a broiler farm.*

**Key words:** broilers, EPEF, farms, profitability

## **INTRODUCTION**

The consumption of poultry meat is from 25% to 37% of total meat consumption in different countries around the world. Is about 18 kg to 26 kg poultry met per capita in different European countries (Eurostat, 2016)

In Albania there are a lot untapped reserves still in terms of the production of poultry meat and its consumption per capita of the population.

Better management of broiler farms as well as close and continuous tracking of economic and financial output indicators to get maximum effectiveness is a continuous task of farmers being helped by the technicians.

Economic efficiency could be expressed as a combination of technical and allocative efficiencies. Technical efficiency gives an idea about how to minimize input utilization in the production process of a given output vector. Alternatively, it also refers to how to maximize an output vector without changing input quantities used.

Different authors are analysed the efficiency with different methodes. There are two widely used efficiency measurement methods of a decision making unit, one is the non-parametric Data Envelopment Analysis-DEA and the other is the parametric Stochastic Frontier Analysis- SFA (Iman R, 2012; Asghar et al, 2013; Hjalmarsson et al, 1996).

The purpose of our study is to assess the economic effectiveness of some broiler farms via calculation of the European Production Efficiency Factor (EPEF).

## **MATERIAL AND METHOD**

During the monitoring period they were carefully completed the main data and the main indicators at each broiler farm. Data for daily consumption and total feed consumption were recorded. Mortality, weekly weighting surveys were conducted to extract the daily weight gain.

Performance parameters investigated during the monitoring for each unit were: final body weight (BW), Feed conversion ratio (FCR), the mortality, livability as well as the economic efficiency of growth, through the calculation of European Production Efficiency Factor (EPEF)

Based on the methods of monitoring, recording, analyzing and synthesizing concrete results, we reached conclusions and recommendations that we think have value to support the broiler farms in our country.

The obtained results according to the Methodology were statistically processed for average values. To study the linkage between technical and economic indicators several correlations were calculated.

## **RESULTS AND THEIR DISCUSSION**

Analysis of some economic indicators in 8th broiler farms. The following table summarizes all of the indicators we followed and analyzed over a period of 39 days to dispatch the birds to the slaughterhouse for the 8th farms studied.

Below we will analyze in detail the indicators we need to calculate the European Production Efficiency Factor (EPEF) for

each farm. Some authors are expressed the above factor as European Efficiency Factor-EEF Index (Novaki, P et al 2004)

**Table nr. 1. The economic indicators in 8-th broiler farms in our study**

Indicators	Farm nr 1	Farm nr. 2	Farm nr 3	Farm Nr. 4	Farm nr. 5	Farm nr 6	Farm nr 7	Farm Nr 8
Number of birds	20000	20060	19950	20000	20000	20100	20050	20030
Mortality (Birds Nr)	1820	802	1117	1300	1000	342	782	381
% of the mortality	9,1	4,0	5,6	6,5	5,0	1,7	3,9	1,9
Birds in sloterhouse	18180	19258	18833	18700	19000	19758	19268	19649
% of the viability	90,9	96,0	94,4	93,5	95,0	98,3	96,1	98,1
Total Live weight(kg)	33451	39671	36348	34408	37810	35564	43468	36134
Weight in Kg/bird	1.840	2.060	1.930	1.840	1.990	1.800	2.256	1,839
Weight gain(gr/day)	47,4	53,2	49,7	47,4	51,3	46,3	56,8	42,8
FCR	1.96	1.81	1.91	1.93	1.86	1.79	1.58	1,57
EPEF	<b>218,8</b>	<b>280,2</b>	<b>244,6</b>	<b>228,7</b>	<b>260,1</b>	<b>253,6</b>	<b>292,77</b>	<b>273,7</b>

## 1. Birds sent to the slaughterhouse

We noted separately the number of dead birds, day after day, until the removal of broilers to the slaughter house. In the slaughter house besides the number of birds we also marked their total weight.

The data for the birds that were sent to the slaughterhouse (Livability) and the mortality are shown in the table nr. 1, for the 8th farms taken in the study.

The mortality rate is at physiological levels in the range from 4-8% (Bilgili, S 2005; Broiler Management Manual Ross-308, 2009). There is only an exception in farm nr. 1 that has the mortality slightly higher, which indicates that the other 7 farms have a mortality within normal levels. The lowest rate of mortality we have on farms, no. 6, no. 8, no 7, no. 2 and no 5, respectively 1.7%; 1,9; 3.9; 4% and 5%, which relates not only to the care of technicians technicians and farmers for the good management of the herd, but also to the creation of the best conditions for the environment and hygiene and zoo veterinary service .

## **2. Feed Consumption Rate in the broiler**

We have determined the Feed Consumption Ratio with the result derived from the ratio of total consumed feed to the live weight of the heads taken to the slaughterhouse.

The Feed Consumption Rate (FCR) expresses the amount in kg of feed consumed by birds to add 1 kg of live weight. Practically, this means that a good reward for used feed gives greater weight gain, achievement of planned weight at the defined breeding time, and ultimately economic efficiency, which is now demanded by farms livestock (Emmans. GC, 1997; Novak P. et al, 2004; Peric. L et al, 2009).

In the table nr. 1 it is clear that the best result is the farm number 8 and 7 followed by farm nr. 6, nr.2; nr. 5; no. 3; no. 4, and finally farm No. 1. Farm number 1 has the lowest score, so more feed is consumed at this farm (1.96 kg) to get 1 kg of live weight, which obviously significantly increases the cost of production.

## **3. Average slaughter weight and daily weight gain**

### *a). Average weight til slaughterhouse.*

Farm No. 8 and no1 has led 39 days olds to slaughterhouse with an average weight of relatively low per birds (1.84 kg). The best weight was taken on the bird farm number 7 in which at the same slaughter age it had an average weight of 2.256 followed by farm no 6 with 2.06 kg, farm no. 5 with 1.99 kg, farm no. 3 with 1.93kg, and farm no.4 with 1.84 kg average live weight per bird.

### *b). Daily weight gain*

The average daily weight gain for the 7th bird farm was respectively: 47.4gr; 53.2gr; 49.7gr; 47.4gr; 51.3gr; 46.3 gr ; 56,8 gr and 42,8 per day, for Farms no.1, no.2, no.3, no.4, no.5, no 6, no.7 and no 8.

#### 4. The European Production Efficiency Factor (EPEF)

As mentioned above, the **European Production Efficiency Factor (EPEF)** is a synthetic indicator and is calculated with the following equation (Mavromati. J et al, 2008; Bilgili, S 2005).

$$\text{EPEF} = \frac{\text{Flock livability (\%)} \times \text{average live wait (gr)} \times 100}{\text{Age in slouter house} \times \text{FCR}}$$

For a good level of broiler farm, the **European Production Efficiency Factor (EPEF)** should be an index above 260 (Vasilopoulos V, 1985; Hurwitz. S and Talpaz. H, 1997; Broiler Management Manual Ross-308, 2009), so the goal for each farm should be to exceed the value of 260 EPEF index.

According to the formula above, the European Productivity Efficiency Factor (EPEF) of Output was calculated for the 8th farms in the study and resulted as the following:

$$\text{EPEF Farm no.1} = \frac{90.9\% \times 1840 \text{ gr} \times 100}{39 \times 1.96} = 218.8 \text{ EPEF} = 218.8$$

**Table No. 2. The European Production Efficiency Factor (EPEF)**

Indicators	Farm nr 1	Farm nr. 2	Farm nr 3	Farm nr. 4	Farm nr. 5	Farm nr 6	Farm nr. 7	Farm nr. 8
Livability % of birds in slouterhouse	90,9	96,0	94,4	93,5	95,0	98,3	96,1	92,1
Average weight/bird/kg	1.840	2.060	1.930	1.840	1.990	1.800	2.256	1.839
Day till slowner	39	39	39	39	39	39	39	39
FCR	1.96	1.81	1.91	1.93	1.86	1.79	1.58	1.57
EPEF	218,8	280,2	244,6	228,7	260,1	253,6	292	273,7

From the above estimates of the European Production Efficiency Factor (EPEF), it is obvious that the highest EPEF Factor results in farm no. 7 ; no 2 and no 8 At these farms the European Productivity Efficiency Factor (EPEF) was 292, 280.2 and 273,7 with a significant difference compared to other farms, followed by farms no.5, no.6, no.3, no.4 and no.1, with EPEF , respectively 260.1; 253.6; 244.6; 228.7 and 218.8.

In obtaining the highest results on farm no.7, no. 2, and no 8 is the good herd management, good breeding conditions,

controlled humidity, layers and isolated buildings, as well as good zoo veterinary service (Sarica, M et 2004; Soeholm J.P 2004; Vasilopoulos. V 1985).

As we can see above, the European Production Efficiency Factor (EPEF) shows how effective the investment made in units of time is. In the concrete case, through our study it is verified how much the interest is, the profit obtained from a farm or a corresponding bird group within a farm.

Undoubtedly, the indicators that are part of the European Production Efficiency Factor (EPEF) such as: Birds brought to slaughter, slaughter weight, FCR, days till slaughter, which we mentioned and analyzed specifically above, are better at farm number 7 , 2, and 8 and the result of the European Production Efficiency Factor (EPEF) is higher.

## **CONCLUSIONS**

From the monitoring and calculation of some production indicators in the 8th industrial growth farms of birds (broiler farms), we conclude that:

From 8 farms surveyed, only three of them have the highest European Production Efficiency Factor (EPEF) of the minimum needed to be a farm with efficiency and high profitability. Farms no 7 , no 2 and no. 8 have respectively 292 , 280.2 and 273,7 the European Production Efficiency Factor (EPEF) of 260, which is the minimum of this index in the developed European countries.

The European Production Efficiency Factor (EPEF) is a synthetic indicator that is indispensable to be followed and counted in every broiler farm. Since it is an indicator that attaches well to the main production indicators such as slaughter weight, feed consumption ratio, mortality and viability, weight gain etc. So, if the EPEF is higher than 260 that means

that the broiler farm will be higher economic effectiveness or profit for the farmer.

Referring to our analysis as well as data obtained from farms we need to monitor and record all data and economic indicators in the broilers such as: Feed Consumption Ratio (FCR), mortality, daily weight gain, slaughter days, etc., which are necessary to calculate the cost and economic efficiency of a broiler farm.

## **REFERENCES:**

1. EUROSTAT, 2016.
2. Bilgili, S. PhD. Department of economy and poultry, Auburn University, USA. 2005.
3. Broiler Management Manual Ross-308, 2009
4. Mavromati. J et al, 2008. Acta microbiologica Greece, No 1, 2008. "The results of antibiotics using on mycoplasmas control in broilers"
5. Novak . P et al, Acta Vet. BRNO, Cz 2004 "Modeling of body Mass Increase and Feed conversion Ratio in Chickens ROSS 208"
6. Peric. L et al, Jappt Poult Res 2009, 18:402 "Effect of selenium sources on performance and meat characteristics of broiler chickens".
7. Sarica, M., et al .The effects of litter on broiler performance and environmental conditions of broiler houses. Proceedings XXII World poultry congress. 2004.
8. Soeholm J.P, Denmark. Management and housing system for broilers. Proceedings XXII World poultry congress. 2004.
9. Vasilopoulos. V. Diatropi thilastikon kai ptinon. 1985.
10. EMMANS, GC 1997: A method to predict the food intake of domestic animals from birth to maturity as a function of time. J theor Biol 186: 189-199.



11. HURWITZ, S and TALPAZ, H 1997: Modelling of growth. In: Proc. 11th European Symposium on Poultry Nutrition, Faaborg 1997, pp. 148-157.
12. NOVAKI, P et al 2004: Modelling of Body Mass Increase and Feed Conversion Ratio in Chickens ROSS 208. ACTA VET. BRNO 2004, 73: 17–22
13. Ismat Ara Begum et al, 2011: Contract Farmer and Poultry Farm Efficiency in Bangladesh: A Data Envelopment Analysis (DEA) . Applied Economics, Taylor & Francis (Routledge), 2011.
14. Iman, R & Behmanesh, R. (2012). Improve poultry farm efficiency in Iran: using combination neural networks, Decision Trees, and Data Envelopment Analysis (DEA). Research Journal of Poultry Sciences, 5(3), 39-49.
15. Asghar Abol Hasani et al 2013: Measuring Iranian provinces efficiency in meaty Poultry production by use of Data Envelopment Analysis (DEA), Intl. Res. J. Appl. Basic. Sci. Vol., 4 (11), 3338-3346, 2013
16. Hjalmarsson, L et al 1996: DEA, DFA and SFA: A comparison. 389 *Journal of Productivity Analysis*. 7(2/3), pp. 303-328.