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# IMPORTANCE OF INVESTMENTS FOR DEVELOPMENT OF TABLE EGG PRODUCTION COMPETITIVENESS

Ana Crnčan, Ljubica Ranogajec, Jadranka Deže, Jelena Kristić

Original scientific paper  
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## SUMMARY

**Competitiveness of table egg production in the Republic of Croatia is closely related to the process of adjustment to EU standards. Following the EU legislative, laying hens will be kept in improved cages and within alternative keeping systems (outdoor keeping, deep litter keeping and indoor caged layer keeping). In order to determine prerequisites for table egg production development, the present research aimed at evaluating investment requirements table egg producers were faced with. Obtained research results proved that production infrastructure and equipment at about 80% of analyzed farms did not meet required standards, and only 20% of producers could assure technical and technological conditions as required by the legal regulations. While being in the process of EU standards adjustment, producers indicated that the greatest threat was primarily found in the increase of production costs, and secondly in the lowering production capacities. Sustainability of production and competitiveness of table egg producers would be possibly assured by efficient production organization which would involve horizontal relations between producers.**

**Key-words: investments, competitive ability, egg production**

## INTRODUCTION

According to the EU Council Directive 99/74/EC there are minimum standards determined about laying hens protection. This Directive prohibits the usage of conventional cages starting with 1<sup>st</sup> January 2012. After that date, table egg production will be allowed only in improved cages or within alternative keeping systems.

The stated Directive is incorporated into Croatian legislative, and refers to acts and regulations that define conditions of laying hens keeping. They are Animal Protection Law (Zakon o zaštiti životinja – NN, 135/06), Regulation of Minimum Conditions for Laying Hens Protection (Pravilnik o minimalnim uvjetima za zaštitu kokoši nesilica, NN, 77/10, NN 99/10), Regulation of Protecting Animals Grown for Producing Purpose (Pravilnik o zaštiti životinja koje se uzgajaju u svrhu proizvodnje, NN, 44/10) and Rules of Laying Hens Farm Registration (Pravilnik o registraciji gospodarstva na kojima se drže nesilice, NN, 113/10). Table egg production in Croatia is focused on keeping laying hens in conventional cages, which do not meet requirements determined by the above mentioned regulations, which will come into force 12 months after Croatia joins the

EU. Although consumption of poultry products records positive trends, there is still a threat that some producers will not be able to meet requirements and standards primarily due to lack of financial means required for investments. Even in some European countries, there is a significant number of egg producers that cannot fulfill necessary conditions, and it is assumed that up to 60% of producers will leave the table egg production sector (Agra CEAS, 2004). Due to high initial investments and constant production costs increase, this paper focused on analysis of capital investments needed for equipment, as determined by the regulations. There are also issues raised on whether Croatian producers will leave table egg production sector manage to invest in equipment and infrastructure, thus continuing their business or will required capital investments be cost effective and which keeping system will producers opt for. Producers' decision will depend on available financial means and on experiences gained by producers in other European

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countries that have already implemented legal directive. For the purpose of carrying out the research and determining effects that the stated regulations will have on producers' adjustments to new conditions, the authors carried out a survey in form of individual questionnaire about investment possibilities of table egg producers, aiming to determine preconditions for egg production development.

## MATERIAL AND METHODS

In order to assess implementation of the European regulative and to determine potentials for its realization and possible shortcomings in the table egg production sector, there was a survey carried out in form of individual questionnaires combined with the interview method. Questions were formulated as a combination of open and closed types. Total sample involved 33 table egg producers. Target group were producers with the most significant share in the table egg production on Croatian market, whose production capacities were higher than 50 000 laying hens. According to data of the Croatiastočar Association, there are currently 10 producers in Croatia with capacities of more than 50 000 laying hens, while in this survey six of them participated. The rest of 26 examinees dispose of production capacities of 10 000 to 60 000 laying hens, while one producer has slightly less than 10 000 laying hens. Besides analysis based on questionnaires, this research involved the following: quantitative methods for assessing cost benefits of investments, sensitivity analysis, SWOT analysis and methods of analysis and description, as well as recent literature dealing with poultry production issues. Net present value of investment was calculated as a form of quantitative method for measuring cost benefits of capital investments. Obtained value showed total financial result gained by investment during its existence period. Other applied quantitative methods referred to profitability of investments and payback period of invested means.

## RESULTS AND DISCUSSION

Equipment of production facilities owned by about 80% of examinees did not meet determined norms. Other 20% of examinees had a possibility to adjust their technical and technological conditions in order to fulfill conditions set by legal regulative. The most common problems related to table egg production are:

- unfavorable supplies and selling market (rang 1),
- poor horizontal relations – insufficient cooperation between producers (rang 2),
- insufficient financial support of complementary institutions (rang 3), and
- disloyal import of table eggs (rang 4).

Supplies market determines high prices of chicken feed and of other inputs necessary for table egg production. Referring to total costs of production, costs of laying hens feed take up more than 50% (Van Horn,

2003). Market price of eggs does not increase proportionally to the increase of production costs, so there is a small difference between egg production price and market price. Another problem indicated by producers is low level of cooperation between them, which can be explained by their mutual competition, market competitiveness rules and struggle for market prevalence and better market position. Low net market price of eggs is a consequence of such circumstances. In order to provide necessary investments into egg production, producers need significant financial means. The authors need to point out that egg production sector in Croatia was not awarded any state subsidies up to 2008. In 2008, the state subsidies were for the first time granted to poultry producers, table egg producers and producers of reproductive eggs, and even then only 15% of allowed financial means was awarded to table egg producers. State subsidies were granted in 2010 for reconstruction and infrastructure equipment, however only to producers with capacities of 350 to 10 000 laying hens. As producers within the table egg production structure were mostly focusing on intensive production with capacities that were over determined quotas, in 2010 they were not eligible to receive state subsidies. The 78% of producers recognized the increase of production costs as the most important threat for their production advancement. Lowering of production capacities was indicated as a problem by 22% of examined producers. The amount of needed financial investment per laying hen will depend on existing infrastructure conditions and required reconstructions. Different amounts in price increase as referring to the mode of laying hens keeping (Elson, 2008, Fisher and Bowles, 2002), are as follows: 10 - 25 € per hen for cage keeping, 30 – up to 50 € per hen for alternative keeping. If considering forthcoming necessary investments in equipment and infrastructure, existence of domestic table egg producers will be brought under question. In order to justify investments in equipment, the research focused on quantitative methods to evaluate cost effectiveness of required investments. The analysis is based on production capacity of 60 000 laying hens, which corresponds to average capacity of involved producers. By introducing improved cages in production, existing capacities are lowered by 25%, which then refers to 45 000 laying hens and average yearly production of 13 725 000 eggs (Kralj, 2005). Costs of cage replacement are 15 € per laying hen. This amount is calculated according to current market supplies and refers to replacement of old cages with improved ones. Investments costs do not include infrastructure reconstruction costs, which amount to total of 715 500 €. Possible investment source is a 10-year long loan amounting to 675 000 €, with a yearly interest rate of 6%, and a two-year grace period. Based on the data on average amounts and prices of required elements for one production cycle, there are total production costs calculated for the 10-year long period. Value of elements incorporated in the cost structure is increased in proportion to expected

growth of prices for the forthcoming period (Salvatore, 2001). In the total cost structure, values of fixed means, invested capital and interests on invested means have a decreasing tendency. Net present value is calculated on the basis of data on total income and total costs, and on appropriate discount rate. Opposite to the method of net

present value, whose business efficiency is based on money flows over 10 years, calculation of profitability of real estate has followed the assessment of economic efficiency as seen through average values within one year (Kay et al., 2008). Presented indicators are calculated by the authors and shown in the Table 1.

**Table 1. Indicators and value of quantitative methods of analyzed capital investment**

*Tablica 1. Pokazatelji i vrijednosti kvantitativnih metoda analiziranoga kapitalnoga ulaganja*

Indicators of quantitative analysis <i>Pokazatelji kvantitativne analize</i>	Formula	Result <i>Rezultati</i>
Net present value (in 000 €)/ <i>Neto sadašnja vrijednost (u 000 €)</i>	Discounted net income - discounted net costs 12 791 – 8 341	4 449 €
Profitability rate <i>Stopa profitabilnosti</i>	Average yearly income from investment : average invested capital × 100 1 746 337 : 715 500 × 100	244.07%
Payback period for invested capital <i>Razdoblje povrata uloženoga kapitala</i>	Total invested capital: average yearly net income + average yearly amount of amortization 715 500 : 74 871	9.6 years

Obtained net present value of 4 449 945.50 € indicated that investments would be justified, because the amount was higher than the value of applied discount rate. Profitability rate for total invested capital was 244.08%, which showed average interest charging on invested capital. Measures which could affect increase of profitability in the table egg production sector are costs or egg market price lowering increasing. Capital invested in the purchase of equipment over the period of 9.5 years will be returned in form of profit through reali-

zed activities, and also in form of amortization. Payback period of investments is within planned repay of loan, so the investment could be taken as justified. Sensitivity analysis presupposes burdening of analyzed project by different negative parameters. Table 2 presents results of sensitivity analysis of investments obtained by changing of the production input value and egg price. The authors analyzed percentage increase and decrease of costs and of income by taking into account supposed changes up to ±25%.

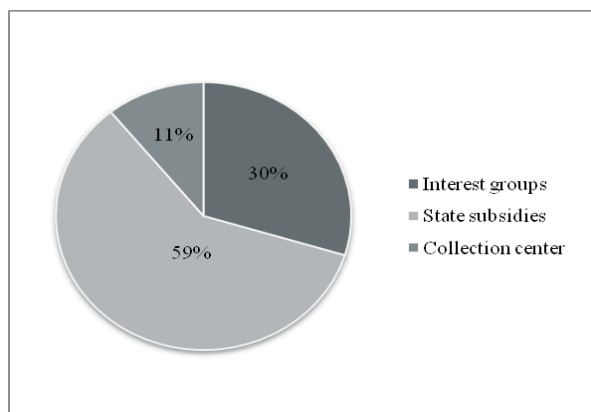
**Table 2. Sensitivity analysis for net present value (in 000 €)**

*Tablica 2. Analiza osjetljivosti za neto sadašnju vrijednost (u 000 €)*

Percentage of change of costs structure <i>Postotak promjene u strukturi troškova</i>	Percentage of change of egg price / <i>Postotak promjene cijene jaja</i>						
	25%	15%	10%	Base/income <i>Baza/prihodi</i>	-10%	-15%	-25%
25%	5 566	4 215	3 636	2 368	1 096	449	-831
15%	10 076	5 120	4 481	3 201	1 930	1 283	1 891
10%	6 817	5 538	4 898	3 619	2 347	1 700	419
Base/costs <i>Baza/rashodi</i>	7 647	6 368	5 728	4 449	3 177	2 531	1 249
-10%	8 531	7 252	6 612	5 333	4 061	3 414	2 133
-15%	8 974	7 623	6 983	5 704	4 432	3 785	2 504
-25%	9 809	8 457	7 818	6 538	5 237	4 620	3 338

Sensitivity analysis determined that net present value changed significantly by changing of specific parameters. Changes of egg price significantly affected business success, while changes of input costs had only slight effect on business result. Producers are not in position to directly influence egg price, which is formed primarily by relations of supplies and demands. However, in order to achieve higher price, producers can opt for some of alternative laying hen keeping systems. Such keeping systems require greater financial investments, but eggs produced within such systems are more expensive on market than eggs produced by hens kept in improved cages. Except for choice of hen kee-

ping system, producers can manage production costs, not in the sense of their lowering, but in the sense of undertaking activities which would assure the greatest possible long-term benefits. Cost management is considered as a part of overall business success management (Beierlein et al., 2008). Due to lack of financial means necessary for investments and assurance of egg production sustainability, even 40% of producers have doubts about future of their business, and 60% of them believe that continuation of their business would be possible, although very hard. Such survey results indicate the possibility of cutting the existing table egg production sector in Croatia.



**Figure 1. Producers' proposals referring to advancement and improvement of sector 4 conditions**

*Slika 1. Prijedlozi proizvođača u cilju nastavka i poboljšanja uvjeta poslovanja*

Figure 1 presents an overview of producers' proposals referring to production advancement and improvement of sectoral business conditions. It is important to recognize the weaknesses that characterize the table egg production sector, and to correlate them with stren-

gths and available opportunities. This would be the way of creating strategy for assuring production sustainability, and consequently for development of competitive advantages. If referring to stated proposals, it can be concluded that efficient organization of production, which presupposes clustering, would be the best way for preserving egg production and for assuring its sustainability. If going in this direction, the production would be organized in a way to produce chickens up to the 18<sup>th</sup> week of age for known buyers, i.e. for table egg producers. They would produce eggs and sell them to the collection center, which would further organize the sale. Such business organization would slow down further increase of production costs, and lower mutual competitiveness of producers. Similar production organization is applied by poultry producers in the Netherlands. The SWOT analysis indicates the mode of potential strength usage, and possibilities of lowering weaknesses that are characteristic for table egg production sector. Based on the obtained results of the authors' survey and taking into consideration experiences of European table egg producers, the authors suggest alternative possibilities for further production improvement, as shown by the SWOT analysis in Table 3.

**Table 3. SWOT matrix with strategic alternatives referring to sustainability**

*Tablica 3. SWOT matrica sa strateškim alternativama u cilju održivosti*

External elements <i>Eksterni elementi</i>	Internal elements / <i>Interni elementi</i>	
	Strengths / <i>Snage</i>	Weaknesses / <i>Slabosti</i>
Opportunities <i>Prilike</i>	Efficient production organization – cluster of chicken and egg producers, establishment of collection center (SO - max/max)	Combining of systems which presupposes egg production in improved cages, as well as within alternative systems (WO - min/max)
Threats <i>Opasnosti</i>	Growth of competitiveness on domestic and international market (ST - max/min)	Redirecting of business to another sector or abandoning of production (WT - min/min)

Survey results prove that producers are aware of the sector weaknesses, however they still have not assessed available possibilities and became aware of their positive impacts. The most favorable alternative presented by the SWOT analysis is organization of production within cooperation of producers of chickens, producers of table eggs and establishment of collection centre. Such production cluster would facilitate easier overcoming of difficulties related to implementation of new regulations. Furthermore, production costs would be lowered, and business results would be better.

## CONCLUSION

In the process of adjustment to new regulations, table egg producers are facing many difficulties, such as increase of production costs, which was recognized by 78% of examinees as the greatest threat related to continuation of their production, and the reduce of production capacities, which was indicated as the biggest problem by 22% of examinees. Due to lack of financial means needed for realization of required investments,

whose sustainability of table egg production depends on, even 40% of producers have doubts about their business future, while 60% of them believe that continuation of their business would be possible, although very hard. Assessment of cost benefits of investments show that expensive investment in production capacities would be justified. Obtained amount of net present value was 4 449 945.50 €, thus considering investing in improved cages as justified. Profitability rate was 244.07%, and payback period would be 9.5 years. Sensitivity analysis indicates that changes of egg market price significantly affect net present value of investments, while changes of cost structure have only slight influence. In order to achieve better egg price, producers have a possibility to produce eggs within some of alternative laying hen keeping systems. However, such production organization affects cost increase, which further requires other actions for the purpose of their lowering. Sustainability of the sector and lowering of table egg production costs can be assured by efficient production organization, which presupposes horizontal cooperation of producers. By joint efforts many of the stated difficulties would be

overcome, thus securing the future of table egg producers and improving their competitiveness.

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## ZNAČAJ INVESTICIJA U RAZVOJU KONKURENTNOSTI PROIZVODNJE KONZUMNIH JAJA

### SAŽETAK

**Konkurentnost proizvodnje konzumnih jaja u Republici Hrvatskoj povezana je s procesom prilagođavanja standardima EU. Mogući načini držanja kokoši nesilica koji će biti primijenjeni, u skladu s legislativom EU, su: kavezni sustavi držanja (obogaćeni kavezni) i alternativni sustavi držanja (slobodno držanje, držanje na dubokoj stelji i etažno držanje u staji). U cilju utvrđivanja pretpostavki razvoja proizvodnje, provedeno je istraživanje usmjereno na investicijske mogućnosti proizvođača konzumnih jaja. Dobiveni rezultati istraživanja ukazuju kako opremljenost proizvodnih objekata ne udovoljava potrebnim normama u 80% analiziranih farmi, dok svega 20% proizvođača ima mogućnost udovoljiti tehničko-tehnološkim uvjetima zakonske regulative. Najveću opasnost prilikom prilagođavanja standardima EU, proizvođači prepoznaju, primarno, u povećanju troškova proizvodnje, a sekundarno u smanjivanju proizvodnih kapaciteta. Opstojnost proizvođača konzumnih jaja moguća je dobrom organizacijom proizvodnje, koja bi podrazumijevala njihovu međusobnu horizontalnu povezanost.**

**Ključne riječi: investicije, konkurentnost, proizvodnja konzumnih jaja**

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