

Proceedings of the



4-7 july 2000 – Valencia Spain

These proceedings were printed as a special issue of WORLD RABBIT SCIENCE, the journal of the World Rabbit Science Association, Volume 8, supplement 1

ISSN reference of this on line version is 2308-1910

(ISSN for all the on-line versions of the proceedings of the successive World Rabbit Congresses)

Lazzaroni C., Luzi F., Biagini D.

**ECONOMIC EVALUATION OF PRODUCTION COSTS
IN AN ITALIAN RABBITRY WITH SLAUGHTERHOUSE**

Volume B, pages 427-433

Economic evaluation of production costs in an italian rabbitry with slaughterhouse

Lazzaroni C. *, Luzi F. **, Biagini D. *

* Dipartimento di Scienze Zootecniche - Facoltà di Agraria - Università degli Studi di Torino
via L. da Vinci, 44 - 10095 Grugliasco - Italy - e-mail Carla.Lazzaroni@unito.it

** Istituto di Zootecnica - Facoltà di Medicina Veterinaria - Università degli Studi di Milano
via G. Celoria, 10 - 20133 Milano - Italy - e-mail Fabio.Luzi@unimi.it

ABSTRACT

Production costs of a rabbitry with private slaughterhouse are analysed on a farm in the Northwest of Italy (Piedmont region). Conventional and detailed choices are made to calculate production costs of three farming processes: rearing of sold-alive rabbits, rearing and slaughtering of light rabbits (up to 2.5 kg of live weight), rearing and slaughtering of heavy rabbits (2.5-3.2 kg of live weight). The cost distribution changes according to the productive process, but the results show that the main costs are for feed (43-55 %) and wages (12-17 %). With a productivity of 55.6 rabbits/doe per year, the sold-alive rabbits profit is 0.76 euro/kg. This result remains unchanged for the heavy rabbits slaughtering (0.76 euro/kg), but it becomes very low for the light rabbits slaughtering (0.21 euro/kg). The slaughtering process reduces the mean profit because the fixed costs are covered by a small number of animals. Possible solutions are analysed with regards to technical farm characteristics and local market conditions.

INTRODUCTION

The determination of the production costs represents an essential tool to evaluate the profitability of productive processes, to notice the change of costs and revenues or to evaluate the effects of innovation. As the variability of environmental, structural, technical and organisational conditions influences a lot of the farm's productive characteristics, the rabbit meat production is- from an economical point of view - one of the least studied sectors. Such variability accounts for a high fluctuation of the obtainable results. Moreover it is also often difficult to give an objective monetary estimation of the implicit costs and to correctly share out the productive processes the common and general costs. Consequently, the average costs for rabbit meat production are highly variable so they are of little interest for economic analysis. It is more useful to verify the influence of the rearing technique on the production costs on a specific farm and to follow their changes over time. This allows a comparison between different rabbit breeding and rearing techniques. Moreover, for accurate decisional processes, it is very important to have ample information about the real economic results, so we have considered a rearing unit with an annexed private slaughterhouse.

Several authors have already studied technical and economic aspects of rabbit rearing (Camps, 1980; Lebas *et al.*, 1981; Grazzani and Moller, 1984; Auxilia, 1984a, 1984b, 1987; Lomonaco, 1997a, 1997b; Goby *et al.*, 1999), but often the survey method does not allow any comparison because to obtain it, an accurate and homogeneous collection of economic data is required. In the present trial we have specified the methodologies for evaluating implicit, common and general costs for each analysed productive process.

MATERIAL AND METHODS

The rabbitry is situated on the Po plain and the owner rears rabbits and directly slaughters some of them. Data, referred to 1998, were collected by direct checking (machinery, number of rabbits, productive structures, goods value, etc.) as well as interviewing the owner (time of work, specific costs, productive factors, etc.). Often it was necessary to change the non-homogeneous technical data into homogeneous units and moreover we decided to convert the economic value to the European currency unit (euro): as a consequence the data could appear excessively accurate.

To determine the production costs we need to distinguish the explicit costs from the implicit ones. In the examined farm explicit costs are attributed to the purchase of animals (Grand Parents), feeds, rearing and slaughtering products, medicines and disinfectants, veterinary services, fuel and lubricants, other current expenditures, insurance, taxes and duties, interest paid and wages. Implicit costs include the depreciation of buildings, vehicles and machinery, land benefit, implicit interests and family wages. The production factors provided by the entrepreneur (land benefit, implicit interests and family wages) are considered incomes for him. Three different productive processes are managed on the farm: rearing of sold-alive rabbits, rearing and slaughtering of light rabbits (up to 2.5 kg of live weight), rearing and slaughtering of heavy rabbits (2.5-3.2 kg of live weight). Different parameters to share out general and common costs have been considered. Purchase of feeds for weaning and breeders, Grandparents, rearing and slaughtering products, medicines and disinfectants, veterinary services, labour for artificial insemination and the disposal of slaughtering waste materials have been shared among the number of total animals or among the number of reared and slaughtered rabbits. For the purchase of feed for fattening rabbits, the number of rabbits and the length of rearing have been used. The wages costs have been calculated considering the effective time of work for each productive process. Rabbit number and length of rearing are the parameters used for the depreciation of buildings, vehicles and machinery. Finally, the expenses for energy, insurance, land benefit, amortisation for capital invested in machinery and breeder animals, taxes and duties are shared with total gross product. Instead, the interests of payments in advance have been calculated for each productive process.

RESULTS AND DISCUSSION

The examined rabbitry reflects the characteristics of other rabbit farms in the area, as appear by several authors (Auxilia, 1987; Tabellini, 1989; aa.vv., 1994; Federici, 1997).

The farm is managed by the owner along with a few wage earners, both full and part time. The workers are the owner (1 HUW, Human Unit of Work, per year), one part time technician for artificial insemination (0.056 HUW per year), one full time worker assigned to rearing (1 HUW per year), and two part time workers for the slaughter house (0.36 HUW per year).

The breeding takes place in traditional barns, in tunnels and open air under shelter, using 580 doe cages, 30-buck cages, 1848 double cages and 150 collective cages for fattening rabbits. The economic length considered for the buildings are respectively of 30, 15 and 40 years, while for cages it is 8 years. The feed is delivered manually and does are artificially inseminated. Fattening length is 90 d for the light rabbits and 110-120 d for the heavy and open air reared rabbits. Other farm data are reported in table 1.

Table 1 - Farm data.

Total area (ha)	3.27
Utilised Agricultural Area (UAA) (ha - %)	2.00 – 61
Buildings area (ha - %)	0.13 – 4
Other areas (ha - %)	1.14 – 35
Human Unit of Work (HUW)	2.42
Effective work hours / HUW x 2300	0.81
Family work hours / wage-earner work hours	0.39
Total machinery value (euro)	25,320
Machinery value (euro) / UAA (ha)	12,660
Machinery value (euro) / HUW	10,463
Total machinery and equipment value (euro)	32,387
Machinery and equipment value (euro) / UAA (ha)	16,194
Machinery and equipment value (euro) / HUW	13,383
Total HP	140
Rabbit value (euro)	35,829
Rabbit value (euro) / UAA (ha)	17,915
Rabbit value (euro) / HUW	14,805
Prolificacy (n. rabbits per doe per year)	55.6
Death rate 3-35 d (%)	20
Death rate 35-120 d (%)	5
Substitution rabbit rate (%)	70

The land benefit has been calculated as 80 % of the average rent for agricultural land with buildings (250.48 euro/ha), adding the incomes of feasible cultivation on the soil occupied by buildings and their service area. The mean income of the farm area for 1998 (7.54 euro/ha) has been used to value the family wages.

Interests of payments in advance have been remunerated with a 4 % rate, with an advance of 3/12 to take into account the length of the production period, while for capital invested in machinery and breeder animals the used rate is 3.8 %.

The maintenance costs for machinery and buildings have been calculated applying a variable rate to the capital, considering their peculiar characteristics. In the case of the buildings, for example, this rate wavers between 0.2 and 0.4 %.

The results of such elaboration are reported in tables 2-3-4-5.

Table 2 - Total gross product.

Category	Animals (N.)	Weight per unit (kg)	Total weight (kg)	Price per unit (euro)	Total amount (euro)
Slaughtered rabbits	12,480	1.5	18,720	3.498	65,483
	4,160	1.6	6,656	3.498	23,283
	4,160	1.8	7,488	3.899	29,196
	5,200	2.0	10,400	3.899	40,550
Partial total			43,264		158,512
Sold alive rabbits	4,160	1.0	4,576	3.357	15,362
	1,560	2.1	3,276	2.582	8,459
Partial total			7,852		23,821

Table 3 - Average rearing consistence.

Category	Animals (N.)	Price per unit (euro)	Total amount (euro)
Grandparent does	2	64.56	129.12
Does (adults + juniors)	1050	18.08	18,984.00
Bucks (adults + juniors)	46	26.86	1,235.56
Rabbits to be sold alive	340	3.36	1,142.40
Fattening rabbits			
< 2 kg	2120	3.36	5,980.80
2-3 kg	1580	4.23	6,683.40
> 3 kg	300	5.58	1,674.00
Total			35,829.28

Table 4 - Productive processes costs.

Costs	Alive rabbits		Slaughtered rabbits			
	Value (euro)	%	2.5 kg l.w.		3.2 kg l.w.	
			Value (euro)	%	Value (euro)	%
Land benefit	127.66	0.72	475.69	0.57	373.76	0.66
General overheads:						
- feeds	9,761.43	54.76	36,305.70	43.49	24,616.47	43.70
- medicines and rearing products	626.26	3.51	1,821.85	2.18	1,024.79	1.82
- disinfectants and slaughtering products			561.37	0.67	230.75	0.41
- veterinary			1,652.66	1.98	929.62	1.65
- fuel and lubricants	260.79	1.46	971.82	1.16	763.59	1.36
- electricity and telephone	384.60	2.16	1,433.14	1.72	1,126.06	2.00
- others expenditure			3,635.86	4.36	2,045.17	3.63
Total	11,033.08	61.89	46,382.40	55.56	30,736.45	54.57
Shares	1,695.36	9.51	11,534.54	13.82	8,190.79	14.54
Taxes and duties	1,945.98	10.91	7,251.47	8.69	5,697.69	10.11
Wages	2,089.00	11.72	14,237.51	17.06	8,589.59	15.25
Interests	935.71	5.25	3,587.69	4.3	2,745.09	4.87
Total costs	17,826.79	100	83,469.30	100	56,333.37	100

Table 5 - Economic results.

	Alive rabbits	Slaughtered rabbits	
		2.5 kg l.w.	3.2 kg l.w.
Total gross product (euro)	23,821	88,766	69,746
Weight (kg)	7,852	25,376	17,888
Mean price (euro/kg)	3.034	3.498	3.899
Cost (euro/kg)	2.270	3.289	3.149
Profit (euro/kg)	0.764	0.209	0.750

Analysing the production costs in the examined farm, it appears that the expenses for feeds are the most important balance voice (43-55 % of total costs), followed by wage costs (12-17 %) and shares for fixed assets (10-15 %).

Despite the heterogeneity of the utilised methods, the results obtained for the alive rabbit production process are in agreement with other authors (Camps, 1980; Lebas *et al.*, 1981; Auxilia, 1984b; Hoyos and Venzi, 1996; Lomonaco, 1997a; Goby *et al.*, 1999), as reported in table 6.

Table 6 - Cost incidence (%).

Costs	Camps (1980)	Lebas <i>et al.</i> (1981)	Auxilia (1984b)	Hoyos and Venzi (1996)	Lomonaco (1997a)	Goby <i>et al.</i> (1999)
Land benefit	-	-	-	0.10	0.23	0.14-0.15
General overheads (feed)	57-79 (55-75)	59.91 (53.26)	54.40 (47.90)	67.00-72.30 (56-57)	56.18 (52.58)	79.30-82.80 (56-58)
Shares	12-22	18.07	16.90	16.60	16.85	12.10-14.70
Taxes and duties	-	-	-	-	-	2.70-2.90
Wages	10-18	22.02	13.50	9.70-14.90	13.48	-
Interests	6-10	-	15.20	1.30	13.26	2.10-3.20
Total	100	100	100	100	100	100

These results are referred to farms of different sizes, so it is possible to make only generalised considerations on the data of mentioned authors and the farm production of sold-alive rabbits. In recent years the breeders have chosen the low investment productive process, as in the case of the examined farm, to reduce the fixed costs. By our estimation building investments is reduced by 80 % for tunnels compared to traditional barns and a further 25 % for shelter compared to tunnels. The profit margin for 400 doe cages in open air is 20 % higher compared to traditional barns (Goby *et al.* 1999).

For the specific entrepreneurial management the depreciation share for machinery and equipment are also low. Instead, the cost for feeds is higher than for the other examined trials, because the rabbits are sold alive at 1-2.1 kg of live weight and the feeds for weaning and breeders affect this item much more.

With a 55.6 rabbits/doe per year prolificacy, the profit is 0.77 euro/kg. Auxilia (1984a) has calculated that the profit is negative with a productivity of 50 rabbits/doe per year, instead Lomonaco (1997a), in traditional barns with 1000 doe cages, obtained the parity between costs and revenues at 60 rabbits/doe per year. The trial of Hoyos and Venzi (1996) confirm that farms housing rabbits in tunnels or barns are profitable above 300 does. Grazzani and Moller (1984) obtained a positive profit with a productivity of 43-45 rabbits/doe and 40-42 rabbits/doe, respectively in barns and tunnels.

Comparing the production of live rabbits with the other farm productive processes, the profit results are very low in slaughtering light rabbits (0.21 euro/kg) and unchanged in slaughtering heavy rabbits (0.75 euro/kg). Both these productive processes yield low profitability, requiring specialised labour and the affects of high fixed costs for a small number of slaughtered rabbits. So, the wages and the shares of fixed assets are respectively 15-17 % and 14-15 % of total costs. These results are in agreement with Lomonaco (1997b), who obtained

a positive profit with a weekly asset higher than 5000 slaughtered rabbits. The entrepreneur would need to increase the number of slaughtered rabbits by means of a service offer. For the analysed farm the slaughtering results are positive only because the local market demands heavy rabbits and is willing to pay premium prices for them. In consideration of everything thus far explained, entrepreneurs can increase their profit by means of diversification and maintaining high quality of their productions and choosing low investment productive processes.

Acknowledgements

The authors wish to thank Mr. Arnaldo Locatelli for the kind collaboration and the supply of data and Ms. Jeanne Griffin for the language assistance.

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