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Application of FAO/CIHEAM indices for dairy systems to dairy goat groups in western Andalusia

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SUMMARY – With the aim of adapting the FAO/CIHEAM indices to the intensive system in western Andalusia, different flocks of dairy goats in the provinces of Cordoba and Seville have been studied. COVAP (Cooperativa del Valle de los Pedroches) data files and active inquiries to farmers (Murciano-Granadina breeders) have been used. Only one representative herd belonging to ACRIFLOR (Asociación Nacional de Criadores de Ganado Caprino de Raza Florida) has been included in the present study. All the studied farms are family-run and operate under intensive conditions even though they have a different number of goats. The technical and economic indices resulting from the study are positive, although greater cost-effectiveness is observed in larger flocks. The future of these farms is assured under the present conditions, that is, with similar milk prices and feeding costs, even without the support of European subsidies.

Keywords: Dairy goat, economic indices, Murciano-Granadina and Florida breeds.

RESUME – *"Application d'indices FAO/CIHEAM pour les systèmes laitiers de groupes de chèvres dans l'ouest de l'Andalousie". Nous avons travaillé avec différents groupes laitiers de chèvres de l´ouest de l'Andalousie pour les caractériser selon les indicateurs FAO/CIHEAM pour systèmes laitiers. Nous avons utilisé les bases de données des entreprises coopératives COVAP et ACRIFLOR, et aussi des enquêtes chez les chevriers. Les deux groupes se composent de systèmes intensifs et à main-d´oeuvre familiale, avec des troupeaux de tailles différentes. Les indices techniques et économiques sont positifs, mais on peut observer une certaine économie d'échelle qui rend plus rentables les plus grands troupeaux. Leur continuité dans le contexte actuel est assurée, même sans les aides de la PAC.*

Mots-clés: *Chèvre laitière, indicateurs économiques, races Murciano-Granadina et Florida.*

Introduction

One of the objectives of research on livestock farming systems is to develop livestock farm characteristics (Gibon, 1994). Thus, it is necessary to increase the knowledge about livestock systems and at the same time to develop technical and economic indices of farms in order to improve profitability and finally to enhance the quality of life of the farmers (Castel *et al.,* 2003).

Currently, an important number of farms in Andalusia, which contributes to 51% of the goat milk produced in Spain (INE, 2005), operatea under intensive systems.

According to this, the first aim of this study is to adapt the FAO/CIHEAM indices (Toussaint, 2002; 2004) to the intensive systems in western Andalusia, studying one group of dairy goat herds in the province of Cordoba and one herd in Seville.

Consequently, this work could be helpful in using these indices for the economic management of farms in the future, enabling farms to optimize human and material resources, and finally to increase profitability.

Family farms are a very cost-effective system, allowing certain uneconomic-scale activities and a high level of profitability per family work unit, although the human factor is the key, and the business

success depends on the level of training and involvement. It is observed that farmers who work with cooperatives obtain high profitability levels, because quality inputs, good prices and specialized technical teams are assured.

Material and methods

The methodology used was an adaptation from Toussaint (2002; 2004) and has been developed according to Castel *et al.* (2003), who worked in the provinces of Cádiz, Seville and Málaga under semi-extensive conditions.

Specific indices for by-products (SUBP-C, SUBPC-C, SUBP-LP, SUBPC-LP) have been added by the research team, because of the importance of by-products, which are not authentic concentrates, in this intensive livestock system.

Different flocks of dairy goats in the provinces of Córdoba and Seville have been studied. The first group, the COVAP's one (Cooperativa del Valle de los Pedroches), is made up of very similar intensive farms of Murciano-Granadina goats advised by the same technical team. At present this cluster is structured in 28 flocks which have been previously described concerning technical and economic aspects (Sánchez *et al.,* 2001a,b; 2003; Santos *et al.,* 2002; Gil *et al.,* 2004). COVAP data files about milk production sold, quality of milk and feeding consumed in farms have been used in order to adapt FAO/CIHEAM indices. Active surveys have been carried out to facilitate completion of the necessary information. The questionnaire was designed according to Falagán (1988) and was filled in by technicians in each farm.

Only one representative herd belonging to ACRIFLOR (Asociación Nacional de Criadores de Ganado Caprino de Raza Florida) has been included in the present study. This flock is located in Seville countryside and breeds Florida goats under intensive conditions. This has been the only herd which has provided all economic facts in the survey for approaching this work. Taking into account that this could be considered as one of the most representative herds of ACRIFLOR, it is necessary to know these indices as an indicative factor for the Florida breed and this type of livestock, not for comparison but to show with the COVAP group. There are technical studies on the Florida breed (Sánchez *et al*, 2004a,b) but until now there are not enough studies to complete livestock characteristics.

COVAP facts have been obtained for 2003 and 2004, and for ACRIFLOR only data for 2004 have been collected, so indices obtained only reflect the situation for these years. Milk and kid prices correspond to 2004.

Data, after checking missing and abnormal data, were introduced into a Microsoft Excel® file. Then, statistical treatment was performed using the same software.

Results and discussion

The principal indices obtained for both groups are shown in Tables 1, 2 and 4, specific indices for by-products (SUBP-C, SUBPC-C, SUBP-LP, SUBPC-LP) have been added in Table 3 and two economic indices (IT-CAB, GOP-CAB) have been added in Table 5 and, logically, grazing areas and grazing indices have not been taken into account.

Table 1. Labour FAO/CIHEAM indices for livestock from COVAP and ACRIFLOR

Index	COVAP (n=28)		ACRIFLOR (n=1)
	Mean	SD	Value
Total labour per 100 goats (MOTCC)	0.74	0.22	0.64
Total family labour per 100 goats (MOFCC)	0.74	0.22	0.61
Total wage-earning labour per 100 goats (MOCCC)	0.00	0.00	0.03
Proportion of family labour to total labour (PMOF) (%)	100.00	0.00	95.60

Table 2. Technical FAO/CIHEAM indices for livestock from COVAP and ACRIFLOR

Index	COVAP (n=28)		ACRIFLOR (n=1)
	Mean	SD	Value
Number of present goats in the herd (CABP)	179.43	76.51	420.00
Replacement rate of herd from breeding (PREN) (%)	30.25	8.28	29.80
Number of animals from breeding to replacement (REN)	50.86	22.39	125.00
Number of animals from breeding to replace dead or culled animals (RENS)	36.29	21.37	92.00
Number of animals from breeding used to increase herd (RENAU)	14.86	5.13	33.00
Present goat fertility rate (F) (%)	93.45	2.20	96.10
Present goat mortality rate (M) (%)	12.18	2.95	7.86
Totals kids born during year (CHNT)	335.89	142.80	611.00
Kids sent to slaughter during year (CHET)	135.93	58.80	265.00
Kids sent to breeding in own flock (CHAREN)	50.86	22.39	128.00
Kids sold for breeding in other herds (CHVREN)	109.32	53.77	170.00

Table 3. Feed indices FAO/CIHEAM for livestock from COVAP and ACRIFLOR

Index	COVAP (n=28)		ACRIFLOR (n=1)
	Mean	SD	Value
Kg of concentrates consumed in the herd by present goat and year (CE-C)	342.59	10.06	461.60
Kg of by-products consumed in the herd by present goat and year (SUBP-C)	155.95	4.58	335.90
Kg of concentrates consumed by goats by present goat and year (CC-C)	271.09	10.47	409.00
Kg of by-products consumed by goats by present goat and year (SUBPC-C)	137.95	4.04	305.80
Concentrates consumed in the herd by litre of milk produced (CE-LP) (kg)	0.71	0.03	0.70
By-products consumed in the herd by litre of milk produced (SUBP-LP) (kg)	0.32	0.01	0.50
Concentrates consumed by goats by litre of milk produced (CC-LP) (kg)	0.56	0.01	0.61
By-products consumed by goats for litre of milk produced (SUBPC-LP) (kg)	0.28	0.01	0.46
Consumed concentrated rate in the herd from dealer (CEAD) (%)	1.00	0.00	100.00
Kg fodder consumed in the herd by present goat and year (FE-C)	287.09	11.10	269.30
Fodder consumed from dealer (FEAD) (%)	1.00	0.00	100.00
Kg fodder consumed by present goat and year (FC-C)	362.80	10.66	69.60

Table 4. Milking indices FAO/CIHEAM for livestock from COVAP and ACRIFLOR

Index	COVAP (n=28)		ACRIFLOR (n=1)
	Mean	SD	Value
Litres of milk sold by present goat and year (LV-CAB)	403.01	18.51	669.60
Litres of milk produced by present goat and year (LP-CAB)	486.70	18.52	669.60
Milk fat rate weighted average produced during year (MG) (%)	5.67	0.09	5.91
Milk protein rate weighted average produced during year (MP) (%)	3.77	0.05	3.45
Bacteriology mean in milk during year 10^3 (BACT)	221.50	101.42	37.00
Somatic cell count mean in milk during year 10^3 (RCS)	1676.07	209.93	1480.00

Table 5. Economic FAO/CIHEAM indices for livestock from COVAP and ACRIFLOR

Index	COVAP (n=28)		ACRIFLOR (n=1)
	Mean	SD	Value
Annual weighted average price of sold milk (PRI) (€/l)	0.55	0.01	0.58
Annual weighted average price of sold kid Kg (PRKCHE) (€/kg)	4.51	0.00	4.50
Gross margin per present goat (MB-CAB) (€)	162.22	17.55	268.22
Total income per goat (IT-CAB) (€)	333.00	17.02	467.19
Operational cost per goat (GOP-CAB) (€)	170.78	4.38	198.97
Net margin per present goat (MN-CAB) (€)	162.22	17.55	265.25
Net margin per litre of milk produced (MN-LP) (€)	0.33	0.03	0.40
Net margin per family work unit (MN-UF) (€)	23893.13	6730.19	43583.60
Net margin without subsidies per present goat (MNSS-CAB) (€)	141.22	17.55	229.67
Net margin without subsidies per family work unit (MNSS-UF) (€)	20105.81	5513.50	37679.60

Both groups are family farms with different herd sizes even though they tend to a gradual increase in the number of breeding females; fertility, over 90%, and mortality, under 15%, are rather good indices observed.

In both groups unifeed mixtures are used as principal food (complete in COVAP and semi complete in ACRIFLOR), so it is necessary to consider the formulation of these diets to differentiate data on concentrates from those of forages.

In the same way, it is interesting to separate the contribution of by-products (beet pulp, orange pulp, soybean husk, cotton seed, etc.) to these mixtures, which is very important because these are not real concentrates; in case of considering these as concentrates we would have to add these feed components.

Different quantities of food by goat were registered (708 kg in COVAP vs. 939.8 kg in ACRIFLOR), due to the high intake and high milk production capacity of Florida breed (Sánchez *et al*., 2004b); but feed efficiencies are similar and high in both cases.

Milk production by goat is high, and logically it is higher for the Florida breed. It is necessary to point out the excellent quality of milk, which is a function of the production level, mainly due to the use of the unifeed system, apart from the breed factors. Moreover, the sanitary and hygienic quality of milk is remarkable, on account of the very good bacteriology indices and acceptable somatic cell counts observed.

Kid production is also very high, and it is worth highlighting the large number of animals for reproduction in this livestock market, and its positive influence on the economic results. In this sense, the good price for milk is notable, due to its quality and the trade through cooperatives. However, kid prices were reduced because of blue tongue problems at the end of 2004, when prices should have increased.

Finally, economic indices by goat, by litre and by family work unit are very good in both cases, even though subsidies are not considered. Nevertheless, these are higher in the ACRIFLOR farm because of its larger size and productive indices. This is a guarantee for the viability of this model, provided that the current socioeconomic situation remains the same.

Conclusions

Spanish local dairy breeds under indoor conditions are cost-effective even without subsidies, provided that milk and input prices remain at the same level as nowadays. In consequence this productive system could be a very interesting activity in rural areas without grazing areas, a very frequent situation in Andalusia, due to the high price of land and the low level of rural labour.

Certain uneconomic-scale activities are observed in smaller herds.

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