Assessment of sheep farming systems within San Salvador District (State of Hidalgo)

Vieyra J., Muñoz J.P., Manrique E., Santos J.C.-R.

in

Assessment of sheep farming systems within San Salvador District (State of Hidalgo)

J. Vieyra*, J.P. Muñoz**, E. Manrique*** and J.C.-R. Santos****

*Departamento de Biología de la Reproducción. Universidad Autónoma Metropolitana, Iztapalapa
Av. San Rafael Atlixco No. 186, Col. Vicentina, Del. Iztapalapa, CP 09340 (México)
**Instituto de Estudios Rurales, Pontificia Universidad Javeriana, Tv. 4 No. 42-00, Piso 8, Bogotá
(Colombia)
***Departamento de Agricultura y Economía Agraria, Universidad de Zaragoza,
Miguel Servet, 177, 50013 Zaragoza (Spain)
****Direcção Regional de Agricultura e Pescas do Norte, Rua do Pinhó, 80 4800-875 S, Torcato (Portugal)

Abstract. Sheep farming systems are, at a world scale, the most important animal production in domestic economy of the temperate zones with low productivity. Within the San Salvador district (State of Hidalgo) the sheep production is managed by farmers with few animals who have scarce technological knowledge and economic capacity. 12 semi structured inquiries were conducted in 14 different communities to the chiefs of the sheep exploitations. Average ± standard deviation, maximums and minimums are presented to characterize sheep systems. A variance analysis (T-test for the continuous variables and Pearson's Chi-square test for the nominative variables) was done in order to evaluate the "LOCATION" effect. It is concluded that the sheep farming system in San Salvador district has a great variability that should be preserved and that there is a need of further studies on its trading activity, namely on its motivations.

Keywords. Sheep systems – Criollo breed – San Salvador-México.

Evaluation des systèmes d'élevage ovin dans la zone de San Salvador (État de Hidalgo)

Résumé. *À l'échelle mondiale, les systèmes d'élevage ovin sont les plus importants parmi les productions animales pour l'économie familiale dans les zones tempérées à faible productivité. Les éleveurs ovins dans la zone de San Salvador (État de Hidalgo) élèvent des petits troupeaux avec peu de maîtrise technologique et de faibles ressources économiques. On a fait 12 enquêtes semi-structurées auprès des chefs des exploitations ovines de 14 communautés différentes. La moyenne ± l'écart-type, le maximum et le minimum, sont exposés pour caractériser le système d'élevage. Une analyse de variance (T-test pour les variables continues et test Chi-carré de Pearson pour les variables nominatives) a été réalisée pour évaluer l'effet de la localisation des exploitations. On a conclu que le système d'élevage ovin présente une haute variabilité qui doit être préservée et qui nécessite d'autres études sur l'activité commerciale, notamment sur les motivations de cette activité.*

Mots-clés. *Systèmes d'élevage d'ovins – Race Criollo – San Salvador-Mexique.*

I – Introduction

Sheep production in México is characterized by a great demand of sheep meat and wool for the traditional knitted garments. It is well paid not only the animal but also the carcass (7.30 €/kg). The "barbacoa" is the main cooking dish of sheep meat, where it is preferred lambs with 35 to 40 kg. More than 70% of the territory has no aptitude for agriculture, only for animal production or forestry. Due to the strong immigration flows the women plays a very important role in the shepherding of the sheep. There are about 50,000 sheep farmers in México, where 34% of them, have its only income from sheep production, for 38% of them, the income from sheep production represents 25 to 50% of total income and for 28% of them, sheep production is a self-consuming activity. The major sheep concentration is around the México federal district, where San Salvador is located (INEGI, 2005).

Options Méditerranéennes, A no. 91, 2009 – Changes in sheep and goat farming systems at the beginning of the 21st century

249

The main economic activities in San Salvador are maize, beans and for what animal production concerns, sheep production leads with 14,600 heads. The sheep is raised for meat production where the local steam cooked "barbacoa" is well appreciated, not only in San Salvador but also in all the State of Hidalgo and Mexico City (DGP, 2000).

Within the San Salvador district (State of Hidalgo) the sheep production is managed by farmers with few animals who have scarce technological knowledge and economic capacity.

In order to have a sustainable farming system we have to be aware of its main characteristics to be possible to design a proposal so the farmers can improve their income (Wit *et al.*, 1994). The information should be about not only economic issues but also about animal production, soil, water and climate issues, energy and social issues (Wit *et al.*, 1994). But depending on the animal species considered and its products, the grazing strategy and social conditions, the sustainability of production systems can go on the intensification direction if the land is of low-grade vegetation resources (Osoro, 1999), like it is the San Salvador district territory. One of the possible intensifications is in the grassland production, combining grass production with plant biodiversity in order not to lose the well adapted plants existing in Mexico (Gibon, 2004). To be viable, it is of main importance that any system should be able to adapt to the local soil and climatic conditions, taking into account the regional economic variables (Oficialdegui, 2002).

The aim of this paper is to characterize sheep systems and to make a comparison of farming systems between locations within San Salvador district.

II – Material and methods

San Salvador district is located near Mexico City (2 hours by car). Fourteen communities were selected where sheep production was of the most important economic activity. In 2006, there were carried out 12 semi structured inquiries (with 48 variables) in each of the 14 communities (except one with 7 and other with 11 inquiries), with a total of 162 inquiries, to the chiefs of the sheep farms. The following questions were considered in the inquiries: (i) farmer's age; (ii) farmer's education; (iii) number of children; (iv) patches surface; (v) cultures; (vi) sheep breed; (vii) flock size; (viii) weaning weight and age; (ix) weight at sell; (x) grazing period; (xi) food supplementation; (xii) shed conditions; (xiii) sanitary conditions; (xiv) animal purchasing; (xv) animal selling; (xvi) number of sold lambs; (xvii) products; and (xviii) wishes towards the future. Average ± standard deviation, maximum and minimum are presented to characterize sheep systems. A variance analysis (T-test for the continuous variables and Pearson's Chi-square test for the nominative variables) was done in order to evaluate the "LOCATION" effect. All the statistic analysis was done with JMP version 3.2.2. (SAS Institute Inc, 1977).

III – Results and discussion

One may say that the sheep system in San Salvador is characterized by aged farmers (75% has more than 40 years), low education (6.5 years of instruction in average) with big families (57% has more than 3 children), with very little flocks (14 animals in average) from a local breed (Criollo) with a minor grazing season (2.5 months in average) and with a very strong trading activity (more than 650 animals traded per farm in average). 49% of the farms do have no crop, where maize and alfalfa are the main crops (49% of the farms). With huge parasitism problems (85% of the farms have parasitism) but despite with a reasonable productivity (0.9 sold lambs/ewe/year in average). The women have a major role in the flock management because they shepherd the sheep for 6 hours per day.

Due to the large number of variables, Table 1 presents only the ones with statistical significance differences are presented, after T-test for location effect.

Table 1. Location effect statistical significance differences

Issues	Community
Patch surface (b)	*
Number of lambs in the flock (b)	*
Number of ewe lambs in the flock (b)	*
Number of ewes in the flock (b)	***
Weaning weight (a)	***
Grazing period (a)	***
Amount of feed supply (a)	**
Shed surface (b)	***
Manger surface (b)	***
Number of rams sold per year (a)	***
Number of ewes sold per year (a)	***
Number of lambs raised (a)	**

*$P< 0.05$; **$P< 0.01$; ***$P< 0.001$.*

Six (a) of these 12 variables are related with economic results of the farm and the other six (b) are related with structural conditions of the farm. We also found statistical significance differences, within the Pearson's Chi-square test, for all the 7 nominative variables (cultures, sheep breed, type of weaning, feed supplementation, sanitary conditions, and future perspectives).

In San Salvador district, there are no such big differences between locations from the point of view of the farming system. Nevertheless, according to the great standard deviations values (weaning weight: 24.1 ± 4.86; grazing period: 2.6 ± 2.10; number of lambs raised per flock: 11.4 ± 8.79) there is a great variability within each location. The main particularity of this system is its strong trade activity (Table 2).

Table 2.Trade activity in number of animals on average per farm (2006)

Variable	Young	Adult	Total
Purchases	942	1723	2665
Selling	1096	1631	2727
Purchases-selling	-154	92	- 62

That is so because it allows to the families to improve their income. Apart the trade activity, it seems that sheep production in San Salvador district is increasing although at a low level, but it is unknown what is the animal selection scheme based on which the farmers select their future breeders. As 73% of the farms rise a local breed (Criollo) it is might be said that there is a great concern about local biodiversity. The productivity (number of sold lambs per ewe) of the local breed Criollo, is of the same level as exotic breeds (Criollo: 0.95 ± 0.38; exotic: 0.91 ± 0.28) due to it is much better adaptation to the local climate and soil conditions which compensates the lower genetic ability.

IV – Conclusions

Although the sheep farming system in San Salvador district is similar between locations, there is a great variability within locations, which should be preserved and valorised. It is needed further studies on its trading activity, namely on its motivations, circuits and impacts on the farming system.

References

DGP, 2000. *Cuaderno de información Básica San Salvador, Estado de Hidalgo*. Dirección General de Planeación.

Gibon A., 2004. Managing grasslands for production environment and landscape benefit – Challenges at the farm and territory level. In: *55th Annual Meeting of the EAAP*, Bled, Slovenia.

INEGI, 2005. *Censo nacional de población y vivienda in anuario estadístico*. Instituto Nacional de Estadística Geografia e Informática.

Oficialdegui R., 2002. Sheep production systems at pasture. In: *Archivos Latinoamericanos de Producción Animal,* Vol 10, nº 2, p. 110-117.

Osoro K., 1999. LSIRD network report in Livestock systems in integrated rural development.

Wit J. de, Oldenbroek J.K., Keulen van H. and Zwart D., 1994. Criteria for sustainable livestock prodution: A proposal for implementation. In: *Agriculture, Ecosystems and Environment,* 53, p. 219-229

SAS Institute Inc., 1977. *JMP, version 3.2.2.*