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Diagnosis of Sheep Production in the Mezquital Valley, Hidalgo, Mexico

Juan Manuel Vargas Romero[1], María Teresa Trejo López[1], Hermenegildo Losada Curstadoy[1], Armando Zepeda-Bastida[2], Deyanira Ojeda Ramírez[2], Maricela Ayala-Martínez[2], Sergio Soto-Simental[2]*

[1] Universidad Autónoma Metropolitana, Departamento de Biología de la Reproducción

[2] Universidad Autónoma del Estado de Hidalgo, Instituto de Ciencias Agropecuarias, Avenida Universidad s/n km 1. Tulancingo, Hidalgo. C.P. 43600

Abstract

a diagnosis was conducted to evaluate productive, economic, environmental and social variables Ovine Production Units (UPO) in 7 municipalities in the state of Hidalgo. These variables were evaluated using the "Ball of snow exponential nondiscriminatory" methodology. The questions were formulated considering the methodology proposed by the Framework for the Assessment Management Systems Incorporating Sustainability Indicators, which integrates and analyzes sustainability in three dimensions. With the results of the interviews, it was established that sheep farming is a predominantly male activity, if you consider that for every two women responsible are five responsible for the male, which are men ranging from 44 to 55 years who have devoted most of his life to this activity. As for the inventory borreguero the predominate race is encaste Suffolk, the most important product of the Borreguera activity is the sale of lambs for fattening and sale of fat lambs, labor is familiar, ie that they do not hire workers, services which tells the UPO are minimal and infrastructure pens usually is bad. The methodology used showed that 96.8% of those interviewed were unaware of the existence and functions of the Center for Agricultural Development of the State of Hidalgo, suggesting an inadequate strategy of rapprochement between specialists and technicians responsible for the UPO.

Keywords: Sheep breeding, sustainability, production variables.

Introduction

Sheep farming in the state of Hidalgo is economic, social, and cultural, considering that until 2014, this activity was in first place nationally in livestock and meat production second channel; contributing 12.3% of the total value of livestock production in the state in that year (1). At present agricultural production must be sustainable, which according to the World Commission on Environment and Development Organization of the United Nations (UN), is "development that meets present needs without compromising the ability of future generations to meet their own needs "(2), which influences the definition of the Mexican authorities to mention that" sustainability is the efficient and rational management of resources, so it is possible to improve the welfare of the present population without compromising the quality of life of future generations "(3). Currently, there are several methods for assessing sustainability, which consider environmental, economic and social factors in agricultural production systems, through different forms of weighting and analysis (4). Such is the case of the Framework for Evaluating Management Systems Incorporating Sustainability Indicators (MESMIS), which is derived from the Assessment Framework Sustainable Land Management, known as Framework for Evaluation of Sustainable Land Management (FESLM) proposed by the Food and Agriculture Organization (FAO), this analysis has an integrative approach and has been used in various research projects in Latin America under that is cyclical, flexible and participatory (5).

In this methodology, the study of regions is important because it identifies a number of problems that interfere with the development and sustainability of production units, and thus could be designed alternative proposals for sustainable management of existing and natural resources. In the state of Hidalgo, the region called "Valle del Mezquital", municipalities with the largest sheep inventory are located; so that disclosure of the applied technologies and programs of government support for sheep farming, are allocated to this part of the state. Local government requires the Agricultural Development Center of the State of Hidalgo (CEFOAH) for "spreading techniques, systems and procedures to increase productivity and improve the sector," according to the decree No. 178 of Law livestock development for the state of Hidalgo in 2006, so since 2008, the center is responsible for the modernization and training of ovinocultores state of Hidalgo.

In this paper some productive, environmental and social variables of sheep production units in 7 municipalities of the State of Hidalgo, were evaluated to understand and characterize this livestock sector.

Materials and Methods

Location of Sheep Production Units

The study was conducted in the State of Hidalgo, Mexico; It is located between 20° 07'18´´N; 98 ° 44'09´´O, located in three physiographic provinces: the volcanic axis Neo, the Sierra Madre Oriental and the coastal plain of the Gulf of Mexico (6). The municipalities where the work was developed had to meet two conditions: being among the 10 municipalities with the largest inventory of sheep heads and

Corresponding Author: Sergio Soto-Simental
Universidad Autónoma del Estado de Hidalgo, Instituto de Ciencias Agropecuarias, Avenida Universidad s/n km 1. Tulancingo, Hidalgo. C.P. 43600
E-mail: sotos@uaeh.edu.mx

having at least one producer who has taken part in the work of dissemination and training of the center of agricultural development of the State of Hidalgo (CEFOAH).

The municipalities were: Actopan (20° 16´05´´N; 98 ° 56´39´´O), Alfajayucan (20° 24´35´´N; 99 ° 20´58´´O), Almoloya (19° 42´12´´N; 98 ° 24´12´´O), Cardonal (20° 36´45´´N; 99 ° 07´00´´O), Mineral de la Reforma (20° 04´21´´N; 98 ° 41´47´´O), San Salvador (20 ° 17´02´´N; 99 ° 00´49´´O) and Zempoala (19 ° 54´56´´N; 98 ° 40´12´´O) (7). The study area is shown in Figure 1.
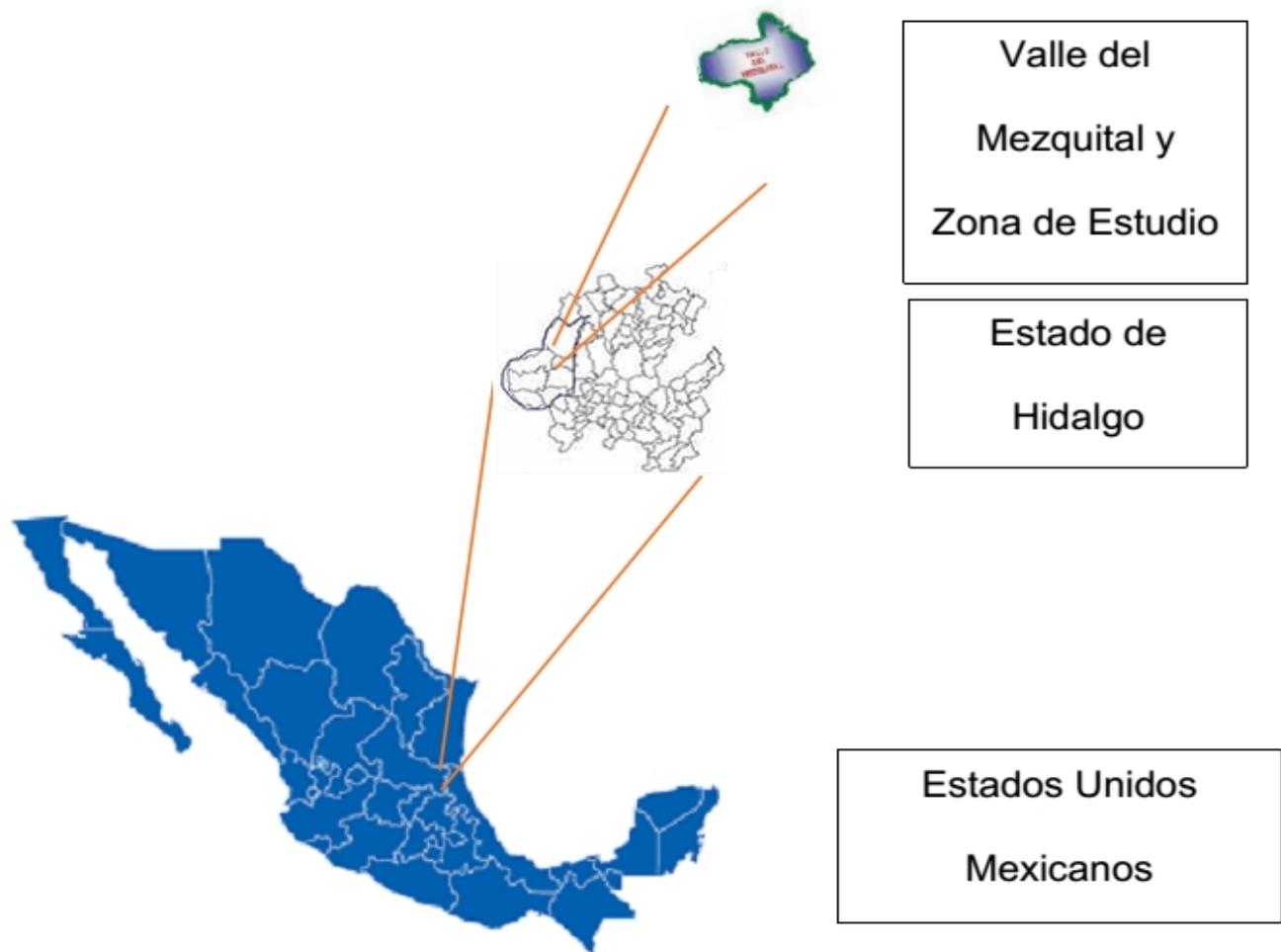

Figure 1. Geographical location of the Valley of Mezquital.

Collection of Data

The "Exponential non-discriminatory snowball" methodology was used in December 2014, (8) to interview 92 heads of sheep production units (UPO) in 7 municipalities with more sheep inventory and influence of the center of agricultural development of the State of Hidalgo (CEFOAH).

The questions were formulated considering the methodology proposed by the framework for the evaluation of systems management by incorporating indicators of sustainability (MESMIS), which integrates and analyzes the sustainability in its three dimensions: Social, environmental and economic, based on attributes that should contain a sustainable management (9).

The interviews were conducted by pollsters who received training to homogenize the criteria of application and answer the questionnaires. Before of field interviews, survey was validated on a small scale. Each charge of the ovine production unit (UPO) was interviewed inside the facilities intended for the sheep breeding, where 52 questions, of which 25 answered them were made you the interviewer (not interviewed) according to what could be observed.

Analysis of Data

With the information obtained is determined subsystems affecting units of sheep production (UPO´s), shown in Figure 2.

a) subsystem family, **b)** agricultural subsystem and; **c)** livestock subsystem.

The information collected by interviewers, was transcribed and organized in a spreadsheet, Microsoft Office Professional Plus 2010 and subsequently analyzed in the PASW Statics 18 (2009) program in Two Steps Clusters mode. the variable that best explained the classification or distinction between two types of Sheep Production Units (UPO) was determined.
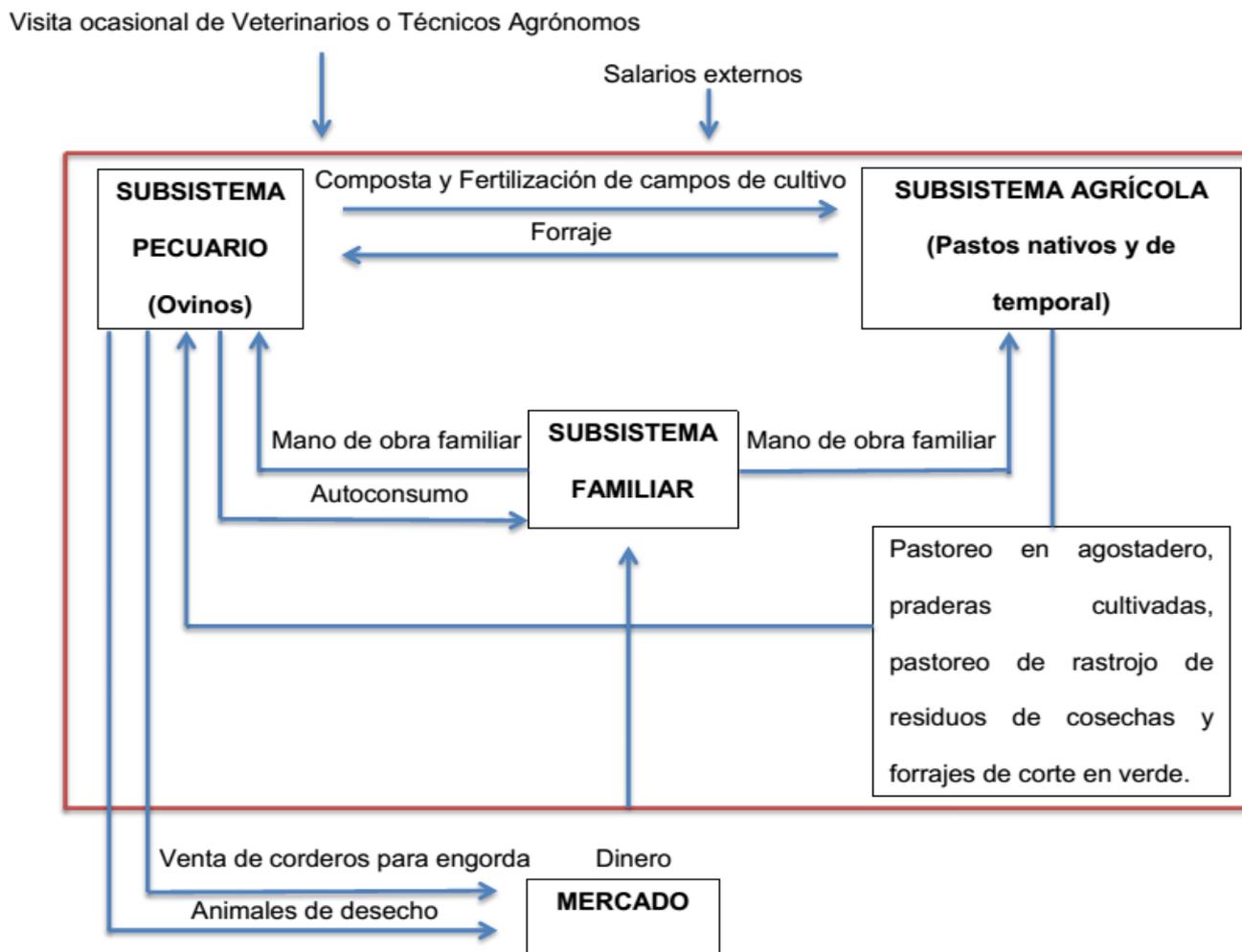
Figure 2. Subsystems that influence the UPO´s.

Results and Discussion

Physical Spaces Where Sheep Farming Is Developed

The terrain of the study area consists of mountain ranges, plateaus, plains, canyons, hills and valleys, it has elevations up to 3350 m. The soils are coarse, medium and fine textures and types of predominant soils are: Phaeozem (PH) 35.84%, Leptosol (LP) 28.76% and Vertisol (VR) 9.08% (7), with annual rainfall of 796.9 mm and an average annual temperature of 18.2 ° C. (10).

The climate that exists in the region is contrasting, because regions of the Warm type wet with rain all year (Af) 0.20%, temperate subhumid with summer rains C (w) 31.47% are up Semiseco tempered (BS1k) 29.65% vegetation cover consists of grassland, forest, jungle, scrub and planting land for agriculture (7).

a) General Data

With the results of the interviews, it was established that the land of each unit Sheep Production (UPO) was 1.4 ha + 0.08, the owners were the producers, the tenure of the head of the Production Unit Ovina (UPO) corresponds to 85.4% is typical, 4.9% and 9.8% is rented is otherwise. Within the field of Unit Sheep Production (UPO) had native grasses and only 61.6% of respondents said they were exploited by sheep in the rainy season which was insufficient to feed livestock throughout the year and should be combined

agriculture that developed outside the Unit sheep Production (UPO) in (not own) ejido land measuring 1.18 + 0.21 ha, including cereals temporary and winter were planted mainly whose Beddings (after harvest) were harvested in situ by sheep. As for the other crops producers responded that improved pastures grown 5.5%, 21.1% cultivated cereals and 11.8% is unproductive land. Crops produced are shown in table 1.

B) Heads of Sheep Production and Their Family Units

Two groups of sheep production (UPO´s) units, were identified with technical, social, and cultural differences in which the variable "age of responsible" was decisive and correlated with other variables. It was found that there was a significant correlation between the age of the person in charge and their grade level (- 0.48), so the age of the person in charge was a determining factor in the school level. We detected two groups (clusters) of producers, responsible for sheep production unit (UPO), the first (55.4%) whose average age was 55 years of age and their maximum grade level was completing primary basic education; and the second group (44.6%) with an average age of 44 years and who completed at least secondary basic education. Schooling was not determined by the municipality where dwelt the head of sheep production unit (UPO).

It sheep breeding in the area of study was an activity predominantly male, if is considered that by each two responsible female existed five responsible of the gender

male, in all case the inclusion of them women in the sheep breeding is limited to activities secondary of support and not is them included in it takes of decisions technical or financial, these decisions, related with it sheep breeding not were the result of an education formal in the area then, the methodology of work and adoption of technologies relied on his 15 years of experience and not technical advice from some professional specialist. East responsible for the units of sheep production (UPO) was the supplier of a nuclear family of four in total.

The 96.8% of those interviewed are unaware of the existence and functions of the Centre of agricultural development of the State of Hidalgo (CEFOAH) and only 3.2% to made any activity in this Centre. 45.1% of respondents said that the main economic income is for activities directly related to the sheep breeding and the 27.5% is for external wages out of ovine production (UPO´s) units, 12.1% for crops, 6.6% by Government support, 5.5% by support of a family member and 3.3%; However, even if the analysis of the data showed two groups of producers, there was no difference between the type of income that depended on his family, since both groups of producers main income was from the sale of lambs for fattening and sale of fat lambs, which shows that this economic activity is important in the study region No matter the age or the academic degree.

Table 1. Main crops of the Mezquital Valley, Hidalgo, Mexico

| | Surface (ha) | | Production (t) | Performance (t/ha^{-1}) |
	sown	harvested	obtained	obtained
IRRIGATION				
[1] Green Beans	----	1,744.4	13,789.2	7.9
[3] Bean	1,005	929	1,519	1,635
[3] Corn grain	2,129	1,669	10,650	6,379
[3] Green Chile	20	11	76	6,950
TEMPORARY				
[2] Barley grain	259	259	984	3.800
[3] Corn grain	25,764	25,764	35,024	1,359
[3] Bean	3,734	3,734	1,754	0.469
PERENNIAL				
[1] Maguey fermented	----	1520.9	174,915 *	115
[1] Green alfalfa	----	48,681.2	5,287,975	108.6
[1] Pastures	----	25,489.1	984,613.1	38.6
[1] Coffee	----	32,558.9	44,481	1.4

* miles L1 data in 2009, 2 data of the year 2013, the year 2014 3data. (13 and 14).

C) Production Data

In terms of inventory borreguero race dominate you is inlaid Suffolk represented by 66% and to a lesser extent by other races that are shown below in Fig. 3. Makers of the sheep production units (UPO), reported to have not increased inventory of stallions over the past year, but the number of females engaged in reproduction. Considering the recommended proportion of male: female (1:25), the increase in inventory of stallions is not a priority, because the current ratio is very close to the suggested (1:28). (11).

This form of sheep production, is classified as a "production system joint", which are defined as "those systems in which more than 10% of the dry matter that feeds the livestock comes from by-products of crops (byproducts) or more than 10% of the value of production comes from agricultural livestock". Globally, mixed farming systems produce the largest share of total meat (54%) and milk (90%) and mixed farming is the main system of small farmers in the majority of developing countries. Mixed farming is probably the most benign agricultural production system, since there are many opportunities for recycling of nutrients (12).

In addition to sheep producers have other animals like goats, cows, horses and pigs at a lower percentage. As mentioned above the most important product of sheep activity and the main entrance is the sale of lambs for fattening and sale of sheep fat, as shown in Fig. 4.
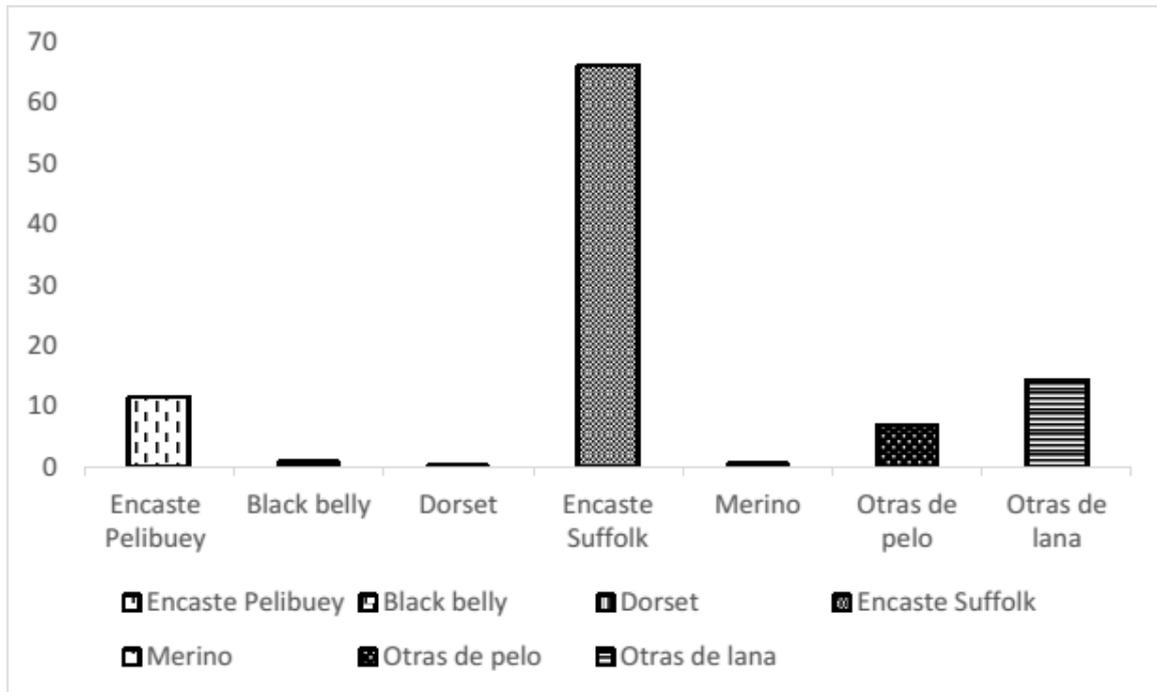
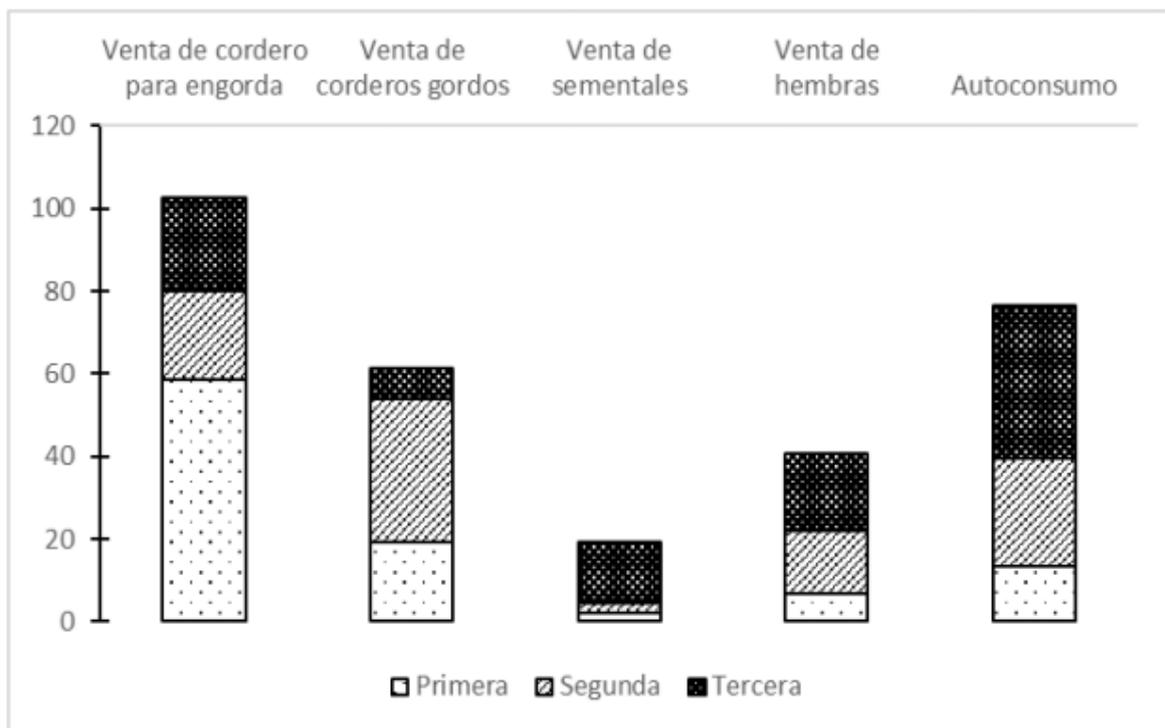**Figure 3.** Percentage of Breeds sheep in the Mezquital Valley

Figure 4. Main products of sheep activity

D) Type of Accommodation

65% of the animals spend much time in corrales, 34% in native grasslands and 1% in induced meadows. In terms of building the 85.9% do not have electricity in the poultry, floor is ground, wall material is wood and lattice, the roof is made of sheet and the general condition of the poultry is bad, the 14.1% if it has electricity, but conditions in the poultry remain the same.

E) Management of Excreta

With regard to the treatment of excreta the 49.45% of respondents said that they stacked, the 30.8% make compost, 14.3% does not no treatment and the 5.5% made another treatment and fate that have these excreta is for fertilization of crops that are 91% of respondents.

F) Power

90% of respondents does not perform any extraordinary power, the type of offering is usually at will, water supply is home making, 73% of the producers made no rations, however, 27% doing so using the following ingredients: corn, sorghum, wheat, barley, oats and other grains with different percentages of inclusion.

G) Management of Rangeland

100% of the interviewed producers nobody determines stocking or perform rotation of paddocks, 96% made a continuous grazing and 4% mixed and the 61.1% of the producers henifican fodder as a conservation method.

H) Permanent and Temporary Labour

95.6% family labour, i.e. that do not hire workers, services boasts the sheep production unit (UPO) are minimal, only the 24.1% of producers have vans or trucks for the transportation of animals. The main type of marketing of animals is for sale by bulk representing the 59.93%, followed with a 38.20% that sells them for heavy. The 32.97% of farmers bought in the past 12 months animals for fattening of 20 kg and the 28.57% buy animals from 20 to 40 kg. The 67.9% of producers make sale farm, they walk the 58.02% perform work on themselves and the 32.1% involved the sale of animals in local markets. The largest number of sheep sold in the past 12 months were males on foot that were sold to another producer. In the last 12 months the 77.18% of them producers not received any assistance technical, however, the 22.82% if received assistance mostly by a veterinary of way casual, of these only the 11.95% was exclusive for sheep, 5.43% for sheep and others products and 5.43% for others products agricultural. 90% of the producers not carry physical records of any kind and the other 10% carry reproductive records in a notebook without format. 66% of producers are reported in subjects related to the sheep through talks with neighbors. On the main problems that producers have with their sheep are economic infrastructure and technical problems.

Producers interviewed 82% mention q would like to generate more information about power and 18% mention that more information about health, 97.8 would like % of the producers is not associated with other sheep producers because they are not interested and unaware of where partnering, however, the 2.18% if they are associated with other producers in a cooperative.

Strengths and Weaknesses of Those Subsystems Detected

Subsystem Family

Internal Strengths: Producers are owners of their land, therefore so are their homes, have dedicated most of his life to the production of sheep, labor is generally familiar and the main income is from sheep-related activities.

Internal Weaknesses: Sheep production units (UPO) are managed, mostly, by men, of approximately 50 years of age.

External Opportunities: Extra agricultural external wage income.

External Threats: The level of education is very low.

Agricultural Subsystem

Internal Strengths: Have own land that reaches 1.5 has, in the field most is native grass where graze the sheep, the treatment given to the manure usually is composting and fertilization of cropland.

Internal Weaknesses: Agriculture develops in Ejido and do not own land and sowing is by storm.

Livestock Subsystem

Internal Strengths: They are slaughtered and processed animal pampering, without having to hire someone and pay salary, the most important product of sheep activity is the sale of lambs for fattening and also for subsistence, as well as sheep they possess other animals like goats and cattle, the supply of water in the pens is home outlet the grazing on rangeland, cultivated meadows, stubble crop residue grazing and cutting in green forages, are performed throughout the year, some producers remain fodder for haying of corn, alfalfa, oats and others.

Internal Weaknesses: Non-functional facilities, poor design, finishing and maintenance, not supplied any of concentrated either commercial, homemade or otherwise, they do not carry any records, buy fodder during the months where scarcity arises, not determine stocking and rotation of paddocks and improvements and services which have the sheep production units (UPO) are minimal.

External Opportunities: Some producers received occasional technical assistance either by a veterinarian or an agricultural technician, the information obtained about subjects related to the sheep is through talks with the neighbors and some producers perform sale walk from farm and others performed in local markets.

External Threats: The major problems faced by producers in their ovine production units (UPO) are infrastructure and technical, the vast majority of producers are not associated with other producers of sheep because not interested partner.

Conclusions

Sheep Production Units (UPO) is characterized as being primarily an activity performed by men, since women are limited to secondary activities and are excluded from the technical or financial decisions. The main problems in the system are infrastructure and technical, non-functional facilities, poor design, finishing and maintenance, no type of concentrate is supplied either commercial, homemade or otherwise, do not keep records of any kind, buy forage during the months where shortage occurs, do not determine stocking and rotational grazing, improvements and services that have are minimal.

The methodology used showed that 96.8% of those interviewed were unaware of the existence and functions of the Center for Agricultural Development of the State of Hidalgo (CEFOAH), suggesting an inadequate strategy of rapprochement between specialists and technicians responsible for Units Sheep Production (UPO).

Acknowledgement

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