



EUROPEAN FORUM

Livestock housing for the future

OCTOBER 22/23 2009 - LILLE (FRANCE)

Proceedings



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10 ■ Farm buildings and working conditions on goat farms: the current situation in Trás-os-Montes (Portugal) and future developments

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In the region of Trás-os-Montes (Portugal) goat breeding is a fairly significant activity, not only in terms of meat and milk production, but also because breeders operate within an underdeveloped region where agriculture is the main activity and alternative economic activities are extremely scarce. Goats are raised in extensive systems; flocks are small and sourced mainly from local breeds. Generally, buildings and facilities are simple, supplying shelter and meeting the basic needs of the animals.

Breeders' association and producers are keen to develop goat raising and improve goat products. We worked with these stakeholders to carry out studies to characterize farm buildings used in goat farms; to identify the constraints and deficiencies of these buildings; to study the work and tasks performed by the breeders inside these buildings; and to improve milking and working conditions on goat farms.

Many buildings have limiting features and lack adequate facilities or equipment. In future, it is advisable to provide technical support to breeders in order to improve buildings and goat housing conditions.

Introduction

Situated in the northeast of Portugal, and bordered to the north and east by Spain, the region of Trás-os-Montes is a mountainous region, composed of several plateaus above 700 m and several mountains with peaks between 1000 m and 1500 m. It is one of the most disadvantaged Portuguese regions and has been subject to a rural exodus to urban centers in recent decades.

In Trás-os-Montes, small ruminants (goat and sheep breeding) have long played a major socio-economic role. This fact is particularly due to the scarcity of alternative economic activities, both at a local and a regional level. Over the last few decades, small ruminants have continued to be the main source of income for many families in the region, and have increased in importance due to the decline of other agricultural activities (cereal crops and cattle, for instance) and the scarcity of alternative economic activities.

Flocks are small and the main breeds that make up the flocks of Trás-os-Montes are local ones. Animals are raised in extensive systems, using traditional farming techniques. Most sheep farms have between 100 and 200 animals and goat farms between 80 and 120 animals. These small flocks provide the main source of economic support for many families in this region, where rural areas have gone through dramatic depopulation and exodus. The income provided by the flock is important in preventing these families from leaving rural areas.

Sheep are used mainly for slaughter production (lamb) whereas goats are raised both for meat and milk production. The kids are exclusively fed on maternal milk and they are slaughtered when they are between four and eight weeks old. Milk production, for cheese-making, is more profitable and has better prospects in terms of production.

Dairy goats in Trás-os-Montes are mainly from a local Portuguese breed, the Serrana. Closely linked to the Serrana breed, there are two PDOs (Protected Designation of Origin): the Transmontano goat cheese PDO; and the Transmontano kid (young goat) PDO. The cheese produced is easily sold due to demand, so an increase in production is likely to occur. The breeders' and producers' associations (mainly ANCRAS, the national Serrana breeders association) intend to improve milk production and milk quality for cheese.

In order to identify the current conditions of buildings and other facilities used in goat farms in this region, we have carried out works designed to: identify the constraints and deficiencies of farm goat buildings, in the region of Trás-os-Montes; study the building plans and internal layout of goat housing; and identify the work and tasks performed by breeders inside buildings.

This paper intends to make a brief presentation and summary of some work carried out in recent years, together with the breeders' associations, bearing in mind the specific conditions of these breeders; it aims to improve and to develop goat raising in this region.

Goat raising in Trás-os-Montes

Like other livestock raised in extensive systems, the basic needs of goat housing are simple and the organization and management of a goat house is mainly determined by the breeding system and the type of production and feeding system (Slade and Stubbings, 1994). Buildings for goat housing have a number of requisites, in order to meet the conditions of animal well-being; they must allow an advanced level of mechanization; have a positive effect on the organization of work performed; make management and equipment costs compatible with livestock-breeding investments; and make the building compatible with the environment and the surrounding area (Mennella, 1999). Moreover, buildings and equipment have a major impact on production quality, and mainly on milk production. The building must provide the breeder with good working conditions and ensure that all of the animals' needs are properly met (Martyn and Astley-Cooper, 1992).

In order to develop goat raising in the region of Trás-os-Montes, it is necessary to improve working and production conditions on farms. For that purpose, it is necessary to introduce changes to the housing and equipment presently used by breeders, since buildings and equipment play an important role in the improvement of working and production conditions and the quality of products (Barbosa et al, 2005). In addition, the development of goat raising may potentially help prevent the population from leaving rural areas; increase the income of rural populations; and improve the production of quality regional products (cheese and goat kids).

It is necessary to propose models and solutions that fit the local goat farming system, so as to encourage breeders to adopt more up-to-date techniques. However, it will be difficult to make breeders change their production system or introduce improvements in buildings for goat housing, unless the solutions can be afforded by the region's breeders (Barbosa et al, 2006).

Farm buildings on goat farms in Trás-os-Montes

As stated before, goats are raised in extensive systems and breeders scarcely make use of buildings to handle flocks. In the future, due to the growth in cheese and milk demand, it is expected that breeders will increase the use of goat housing and facilities. It is therefore important to identify the current conditions of buildings used for goat farms in the region and if these buildings have all the requisites to handle these animals. In addition, more than other farms, those dedicated to milk production need facilities or equipment to handle lactating goats and for milking.

The study of goat housing and the identification of the deficiencies of farm buildings is a good way to understand current conditions and, as a result, to carry out important works to improve goat housing conditions and equipment use. It will also contribute to finding building designs and equipment appropriate to goat farms in the region of Trás-os-Montes.

We selected 74 goat farms from across the region, to study breeding systems and to collect data about buildings, facilities and equipment. Breeders were asked about the work they carry out inside buildings and the procedures, techniques and equipment they use to perform their work (Fitas da Cruz and Barbosa, 2007).

In considering the information collected, eleven variables relating to the layout plan, function and materials were selected to characterize farm goat buildings in this region. Since these variables have different scales of measurement, all were established as categorical variables. The data collected allows us to analyze the buildings from several points of view. This presentation will focus on functionality and working conditions.

In our analysis of functionality, we chose four variables: building plan; internal layout; width of the entrance; and the height of the walls. We also took into account a fifth variable - the age of the building - in order to identify changes or improvements to building construction over time. Table 1 shows the frequencies of the categories for each of these variables, considering the 74 goat buildings studied. Concerning the building plan, the majority are enclosed buildings. A large number have a park outside, attached to the housing, which makes it easier to manage the flock.

Concerning the internal layout, there are many buildings with a single space inside, without any division, pen or fencing. The whole flock (animals with different ages, growth, sex and production) stays in the same area. This type of arrangement does not allow suitable supervision, organization or efficiency to perform work. When the inside space is divided into different pens and animals with different requirements are kept apart, or different areas are set apart and assigned to specific work (like feeding, milking, etc.), it may be assumed that these buildings offer better conditions to work and manage the flock.

Doors (or other types of entrances) and wall dimensions can pose some constraints. There are many buildings that have an entrance under 2 m wide. This dimension is insufficient for the transit of equipment or farm machinery (mainly for tractors and trailers) that could be useful to accomplish work inside. The size of the walls can be an obstacle to mechanization because low walls (under 2 m) represent an obstacle to the circulation of farm machinery. Moreover, low walls reduce the capacity for storage of hay, straw or other supplies.

Table 1 – Frequency tables of the categorical variables analyzed

Variables	Categories	Frequencies	%
Building plan	enclosed building	41	55
	open-fronted building	2	3
	enclosed building with park	31	42
Internal layout	single space	28	38
	pen layout	46	62
Width of the entrance	width under 2 m	31	42
	width over 2 m	43	58
Height of the walls	height under 2 m	5	7
	height between 2 m and 3 m	46	62
	height above 3 m	23	31
Age	built before 1950	18	24
	built between 1950 and 1975	5	7
	built after 1975	51	69

Some buildings used on goat farms were built over fifty years ago. These buildings are very old and generally not suitable for modern breeding techniques and present constraints mainly related to dimensions and materials.

Working conditions in goat farm buildings

When asked their personal opinion, goat breeders from the region consider milking and manure management as the most arduous work, mainly because it is performed manually and involves prolonged periods of physical effort.

At the time the study began, only two members of the ANCRAS association had a milking machine. For almost everyone, milking is an arduous task because it is manual and, while milking, the milker remains in an awkward posture that makes milking stressful and potentially debilitating. Goats are hand-milked in buildings or shelters where they are housed during the night and, usually, there are no places specifically designated for milking, which is done in the straw-bedding area. In these places, the cleaning and hygiene conditions are poor and they affect the quality of the milk and, consequently, of the cheese. To deal with the animals, the breeder uses fences to contain lactating goats, but he has to catch the animals by hand.

Manure management requires manual work on the majority of goat farms (Table 2). On a large number of goat farms, manure handling is entirely manual, where manure is gathered and carried outdoors manually. In other buildings, manure is loaded onto a trailer on which it is transported outdoors. A small number have a mechanical system to handle manure, generally a tractor equipped with a loader on the front. Only a few of the buildings have slatted floors for manure management.

Table 2 – Floor type and manure handling system used on goat farms

Floor	Manure handling system	No. goat farms	%
Straw bedding	removal entirely by hand	21	28
	hand loaded onto a trailer	31	42
	front-loader	19	26
Slatted floor		3	4

The system and facilities used for manure management have improved over time. Table 3 shows the different manure management techniques on goat farms, according to the age of the building.

Table 3 – Manure handling system used in goat farms according to the age of the building

Floor	Manure handling system	built before 1950	built between 1950 and 1975	built after 1975
Straw bedding	removal entirely by hand	16	3	2
	hand loaded onto a trailer	2	2	27
	front-loader	0	0	19
Slatted floor		0	0	3

We found floors with slats only in goat housing built over the last few decades. Also, the only breeders using mechanical systems to handle manure have built goat housing recently. Removal entirely by hand is more frequent in old buildings, perhaps due to trailer access constraints and difficulties, or other equipment, inside the building.

Feeding is performed manually on all goat farms, but it is not hard work. In Trás-os-Montes, goats are raised according to traditional extensive farming systems and rangeland is the fundamental feeding source for goat flocks. A large number of goat buildings have hay feeders inside, generally along the walls, where fodder is supplied manually.

Final considerations and future developments

According to the data collected (and the summary presented here) it is possible to conclude that:

- many goat farm buildings have constraints and deficiencies in building features, mainly related to the dimension of doors and walls, which make the use of machines/equipment difficult or almost impossible;

- use of equipment or machines is scarce and a large number of goat farm buildings lack adequate facilities or equipment to perform work;
- in many buildings, the internal layout is not adequate to perform tasks in good conditions.

To develop goat raising in the region, it is necessary to improve building features, mainly those related to working conditions for milking and manure handling.

Our knowledge of the current conditions of buildings used in the region allows us to propose strategies to improve goat farm buildings, in order to improve working conditions and breeding practices with regard to the breeders' socio-economic conditions.

In terms of future goat housing, it is advisable to draw some templates of the internal layout, which would be made available to breeders. It is also important to provide technical support and information about the construction and equipment, mainly related to milking, feeding and manure removal.

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These are the proceedings of the European forum Livestock Housing for the Future, held in Lille (France) on 22nd-23rd October 2009.

Within a context of major reorganisation and adaptation of livestock housing to meet tomorrow's issues, this forum provided an overview of recent and current research and extension initiatives, with the aim of creating together a coherent visualisation of what will be livestock housing of the future.

This forum was organised by "RMT Livestock housing of the future" which is co-presented by the Institut de l'Élevage (French Livestock Institute) and the Chamber of Agriculture of La Manche, in close collaboration with the Pig Breeding Technical Institute (IFIP) and Poultry Breeding Technical Institute (ITAVI), and also the French Chambers of Agriculture network. The ISA Lille (Life and Earth Engineering Institute) also supported this event.

October 2009

Published by Institut de l'Élevage - 149 rue de Bercy - 75595 Paris Cedex 12 - France
www.inst-elevage.asso.fr - ISBN : 978-2-84148-772-1 - Publi IE : 00 09 33 124