

# **Sheep Housing in Trás-os-Montes. Contribution to Design Buildings and Equipment Appropriate for Local Sheep Farms**

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## **Abstract**

Sheep farming has a great importance in the region of Trás-os-Montes, one of the most depopulated and least favoured Portuguese areas.

We have studied the buildings for sheep housing, in this region, aiming to identify the aspects that may be considered as constraints or problems that can hinder the development of sheep farming in the region. Thus, we selected several villages where we have interviewed sheep raisers, aiming to get to know the sheep farming system and the sheep housing or facilities utilisation; and where we have collected data concerning the buildings for sheep housing.

The main problems and deficiencies about the buildings for sheep housing we have found are related to aged and old-fashioned buildings; small dimensions; deficient indoor accessibility, which make some mechanization tasks difficult; deficient indoor ventilation and natural lighting; and reduced, or total absence of, equipments or facilities to make tasks concerning sheep handling easier.

In presence of these problems, farm buildings researchers can contribute to improve sheep farming and the regional development by proposing solutions to get better facilities in sheep housing, regarding the specific conditions of the regional sheep.

Keywords: sheep housing; rural development

## **Introduction**

Trás-os-Montes, situated in the Northeast of Portugal, is a mountainous region where sheep farming has had a great socio-economic importance throughout time. This fact is particularly due to the scarcity of alternative economic activities, both at the local and regional level. Over the last decades, sheep farming has continued to be the main source of income for many families of the region.

The natural conditions of Trás-os-Montes (i.e. soil, climate, vegetation) are not significant constraints to sheep farming. Farming activities, land utilization, and the socio-economic conditions that characterise this rural area make it possible to raise sheep according to a traditional model of itinerant grazing, which enables an efficient utilisation of natural resources, when the flock grazes over the local territory (Barbosa and Portela, 2000).

The development of sheep raising may contribute to: prevent the population from leaving rural areas; an increase in the rural populations' income; the production of quality regional products; and regional development.

In order to develop sheep raising in the region, it is necessary to improve the working and production conditions on farms. For that purpose, it is necessary to introduce changes in the housing and equipment that are presently used by breeders, since buildings and equipment play an important role in the improvement of the working and production conditions and in the quality of the products. It is necessary to propose models and solutions that fit the traditional system of sheep raising, so as to lead breeders to adopt

more up-to-date techniques. However, it will be difficult to make breeders change their production system or introduce improvements in the buildings for sheep housing, unless the solutions can be afforded by the region's breeders.

With this presentation we intend to expose the methodology used for the study of sheep housing in Trás-os-Montes and for the identification of deficiencies in housing and equipment. This knowledge is important in order to carry out tasks to improve sheep housing conditions and equipment utilisation; and to contribute to design buildings and equipment appropriate for local sheep farms.

### **Sheep farming in Trás-os-Montes**

Trás-os-Montes is formally one of the seven Portuguese agrarian regions. It is composed of several plateaus above 700 m and several mountains with peaks between 1 000 m and 1500 m. The plateaus are crossed by the river Douro and its tributaries (Taborda, 1987).

Trás-os-Montes covers 12 282 km<sup>2</sup> (14% of the national area) and it has 33 municipalities grouped into two territorial statistic units: Alto Trás-os-Montes and Douro. Alto Trás-os-Montes, situated in the north, is the most mountainous area and cattle raising is of particular importance in this part. Douro, along the river Douro, is in the south and it is mainly famous for its vineyards and Port wine.

As mentioned above, Trás-os-Montes is one of the most depopulated and least favoured Portuguese areas and its population has been decreasing since the 60s. The region has 5% of the total Portuguese population, with a density of 36 inhabitants/km<sup>2</sup>, far below the national average, which is 110 inhabitants /km<sup>2</sup>. With 3% of the Portuguese GDP (Gross Domestic Product), the per capita GDP is about two thirds of the national value. Agriculture is a major economic activity and the agricultural population (196 960 inhabitants) represents 44% of the region's population.

Livestock has always played a major role in the agriculture of Trás-os-Montes. As a consequence of this fact, we can find several local breeds of sheep, goats and cattle. Nevertheless, the importance of sheep farming is increasing.

It is obvious that grass production is highly conditioned by a region's orography, soil and climate. However, these factors do not seriously affect sheep raising in Trás-os-Montes. Indeed, both the regional socio-economic conditions and traditional farming favour sheep raising. The high local concern with sheep farming can be inferred from the evolution of regional livestock (Table 1).

Table 1. Number of livestock (females) in the census 1989 and 1999

	1989	1999	var. (%)
Ewes	223 894	273 101	22
Goats	96 998	64 170	- 34
Beef cattle	22 321	17 556	- 21
Dairy cattle	30 760	25 604	- 17

Source: INE (2001)

In the last census (1999), the number of sheep in Trás-os-Montes amounted to 11% of the national total. In the period between the two last censuses, the number of ewes increased, while the number of goats and cattle decreased.

The main breeds that make up the flocks of Trás-os-Montes are local ones. There are six different local breeds which are raised according to the features of each breed. In the north, flocks are used for milk production or slaughter, whereas in the south milk production is dominant. Breeders value the animals' rusticity and ability to adapt to the environment, to endure long walks (from 4 to 6 km a day) and to survive when food lacks (Barbosa and Portela, 2000). Several attempts to introduce more productive breeds were not successful, as animals were raised according to the itinerant system and, therefore, they did not achieve their normal production levels.

Most flocks have between 100 and 200 animals. According to the last census, in 1999, the region's sheep farms possessing over 200 animals represent only 7% of the total number.

Traditional sheep farming is based on long-established knowledge and practices. Its main characteristic is rangeland over the territory. The flock range around all over the unfenced and "free" plots of different landowners, according to old systems of land management (Barbosa and Portela, 2000).

In the context of the traditional sheep farming system, the very concept of farm as a "closed frontiers" unit is questioned. Indeed, the flock is more dependent on external factors than on the farm itself. Itinerant grazing is the main feature of the system and it affects sheep husbandry techniques and sheep housing utilisation.

Over the last decades, several authors have studied sheep raising in the region and they have classified sheep housing as rudimentary and lacking hygienic conditions. Deficient housing conditions are considered to be one of the causes of the low productivity levels of the region's flocks (Marques, 1980).

### **Procedures**

A study which was formerly carried out (Barbosa, 2000) in the municipality of Bragança allowed us to get to know the traditional sheep farming system and identify some deficiencies in the housing and equipment used on sheep farms. Following that study, we extended the work to the region of Trás-os-Montes.

Taking into account the geographic area to be studied; the distribution and importance of the several local sheep breeds; and the existence of different production systems, we chose the villages where to collect data according to their sheep number. Two villages were selected in each municipality: the one that possessed the highest number of sheep and the one with the greatest sheep density. In some municipalities, mainly in the Douro region, the number of sheep is so small that such municipalities were not included in this study. Thus, data collection covered 38 villages of 19 municipalities.

We studied buildings and equipments used by flocks in 226 sheep farms, mainly the building design; building materials; organization of building area; time and periods of sheep housing; organization of labour and equipment used in handling practices.

On these sheep farms, data collection was carried out in several ways: by interviewing breeders; by observing handling practices; and by collecting data about the characteristics and dimensions of the buildings.

The material and equipment used to collect data about the buildings were: a laser distancemeter (Leica Disto metrolaser); a measuring tape (Komayo 3m/10ft); a digital light meter (RS Luxmeter 180-7133).

Several local breeders' associations were contacted aiming to detect the breeders' main difficulties; to get to know the schemes devised to provide aid for building and the strategies followed by the breeders when they build sheep housing.

## **Results and Discussion**

### **Housing and shelter utilisation**

On most sheep farms of the region, the flock is made up of animals belonging to all age groups. Lambs join the flock in itinerary grazing few days after they are born and, frequently, lambs are born in the open, during grazing.

The periods for sheltering and for housing the flock vary throughout the year and according to the production system (dairy or slaughter). The sheltering and / or housing times depend on the season of the year.

In winter, the flock grazes during the day and it is housed during the night.

In summer, the flock is sheltered for two periods. The flock stays overnight for a shorter period, which can take place in rudimentary sheds, fenced areas or buildings. After the morning grazing, the flock is once again sheltered during the hottest time of the day. In this period, the places used for sheltering may be natural shelters (i.e. under trees), fenced areas, rudimentary shelters or buildings.

This diversity of sheltering periods also accounts for the great diversity of shelters and housing. This fact is also the reason why most sheep farms of the region have two or more types of shelters or sheep houses.

Since the flocks graze according to the itinerary system, they may have to move several kilometres a day. That is why almost all farms own two or more shelters or buildings situated in strategic places, whose utilisation varies according to the route used by the flock.

### **Buildings for sheep housing**

Aiming to improve the facilities used to house sheep and contribute to the development of the activity, it is of particular importance to identify the constraints and deficiencies that may affect or hinder the increase in the region's sheep production. It is our concern to identify the aspects related to sheep houses that should be improved, and to emphasize the need to introduce innovations. Sheep house building is usually carried out by the breeder himself, without asking for technical advice, which may account for some deficiencies that can be found in buildings for sheep housing.

Out of the 226 sheep farms studied, 34 don't have buildings that are exclusively used to house sheep. So, breeders make use of rudimentary shelters and / or outbuildings. In the other sheep farms (192) there is a great diversity concerning building materials; dimensions; structures; plans and others.

In these 192 buildings for sheep housing, the main problems and deficiencies that have been identified are:

#### **i) Old buildings**

There are many old buildings used for sheep housing. About 47% are over 50 years old. They were built in times when the needs and demands concerning sheep production were very different from the present ones, and therefore many of those buildings are outdated and inappropriate for sheep housing.

On the other hand, about 43% of the buildings were built in the last two decades, which shows a growing interest in the building of new sheep houses.

#### **ii) Small dimensions**

In a significant number of buildings the area used to house the animals is relatively small (Table 2). This can also be explained by the high number of old buildings built at a time when flocks were very small. However, this problem is not limited to old buildings, since about 13% of the sheep houses that were built in the last two decades are, also, under 100m<sup>2</sup>.

Table 2. Classes of indoor areas

Area	n°	%
<100 m <sup>2</sup>	100	52,1
100 – 200 m <sup>2</sup>	76	39,6
>200 m <sup>2</sup>	16	8,3
Total	192	100,0

The existence of such a great number of small buildings is a constraint to the increase in the number of animals per flock. On some farms, the reduced size of the buildings for sheep housing prevents the growth of the flock.

iii) Deficient entrance to the building

There are many buildings whose doors or gates are too small and hinder access to their inside (Table 3).

Table 3. Classes of door dimensions

Width	n°	%
> 2 m	90	46,9
≤ 2 m	102	53,1
Total	192	100,0

Narrow doors / gates prevent some machines needed for the mechanization of some tasks (such as the removal of waste and straw beds) from entering the building. Mechanization is also hindered by low walls, since 42% of the sheep houses that were studied are under 2,5 m high.

iv) Deficient indoor ventilation

The ventilation in buildings for sheep housing is another problem that was identified. None of them have fans for mechanical ventilation and about 48% of the buildings don't have any openings to allow natural ventilation. Others (about 14%) only have some small openings (all of them under 0,1 m x 0,2 m).

v) Deficient indoor lighting

Since many of the sheep houses don't have any openings or have just small holes, natural lighting inside the buildings is very deficient. Besides, there are very few buildings with electricity. In over 66% of the sheep houses, the values of light intensity were always below 50 lux.

vi) Lack of facilities and equipment

Some tasks involving animals could be made easier through the use of appropriate facilities and equipment. There are many sheep houses which do not have equipment (such as feeders, troughs and corrals) to facilitate sheep handling. These sheep farms have no milking machines either.

In almost all dairy sheep farms, ewes are hand milked in the places where they stay overnight. In these places, the cleaning and hygiene conditions are poor.

### Conclusion

The buildings for sheep housing in the region of Trás-os-Montes present some deficiencies or problems, mainly related to buildings' dimensions; indoor environment; and lack of

facilities or equipment. That must be changed in order to improve the work and sheep handling conditions; to increase breeders' income; and to contribute to rural and regional development.

Technical proposals to modify the building design and facilities for sheep farms of Trás-os-Montes must be appropriate to the traditional sheep farming system. Otherwise, the proposals could be ignored by the breeders of this region.

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