Extensification of Beef and Sheep Production on Grassland

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PORTUGUESE BEEF AND SHEEP PRODUCTION SYSTEMS

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SUMMARY

The total area of Portugal is 8.9 m ha of which 3.8 m are arable. Of the latter, 0.81 m ha is permanent grassland and 0.41 m ha is temporary forages and pastures. Total number of farms is 445,000 of which 77% are less than 5 ha in size. Only 2% of farms are greater than 50 ha. The total population is 9.4 m of which 49% is employed. Of those employed, 11% work in agriculture. This has fallen from 17% in 1990. Total cattle is 1.3 m including 0.36 m dairy cows and 0.25 m beef cows. Since 1990 the number of dairy cows has fallen but the number of beef cows has not increased. Dairy cows are practically all Friesian but beef cows are predominantly native breeds. Beef production systems are very variable with very small herd sizes. It is usually a secondary enterprise to vegetables or crops. Many calves are sold for slaughter at weaning at 6-8 months of age and 200 kg liveweight. Total number of sheep is about 3.4 m. The main purpose of sheep farming is milk production. There are 3 main systems of production 1) intensive -reared on grass and finished on concentrates, 2) upland - lambs produced entirely off grass and conserved forages and 3) hill production with some scavenging on cereal stubbles. Mean carcass weight is 10 kg and Portugal has a deficit of lamb meat. There are a total of about 0.6 m goats.

INTRODUCTION

In Portugal, there are several agrarian regions (Figure 1). Three of them have markedly different ecological conditions - atlantic, mediterranean and continental. Others, result from the interaction of two or three of these ecological conditions.

These ecological conditions made up of the interactions of climate, soils, geographic and demographic factors together with social circumstances endow the country with some favourable conditions for ruminant production, mainly cattle production in the North and Center, and sheep and goat production in the South.

Coastal line North (*Entre Douro e Minho*: E.D M e *Beira Litoral:* B. Litoral) is a region of atlantic ecological influence, and so, has regular temperatures, small pluviometric variation and high atmospheric humidity throughout the year. The soils normally have a high capacity for the production of forages and grasses. The demographic concentration is very marked, with a land structure of very small landowners (Table 1). The smaller lowland areas are used for subsistence vegetable and fodder cropping.

TABLE 1. Distribution of farms according to size and geographic area (ha arable land)

Geographic Area	Total		Farm size (ha) >0-<1		1-<5		5-<20		20-<50		≥50	
	No of Farms	Arable Land	No of Farms	Arable Land	No of Farms	Arable Land	No of Farms	Arable Land	No of Farms	Arable Land	No of Farms	Arable Land
Continente	444875	3821317	90452	55312	253328	569805	78149	720564	13659	413313	9287	
E. D e M	86881	257683	20236	12012	57058	121823	9016	73439	437	12105	134	
T-os-Mont.	75o25	493229	10701	6362	37192	92856	2307	222065	3963	117572	692	
B. Litoral	97345	220532	27207	16516	62822	129367	6862	54973	395	11051	59	
B. Interior	49516	443744	4716	3279	29621	68565	11718	112891	3223	66156	1176	
Rib.e Oeste	78120	498886	19499	12221	42308	98041	13340	116479	1941	57595	1032	
Alentejo	37007	1766677	4543	2731	13974	34132	8808	91603	3771	121054	5911	
Algarve	20381	140566	3550	2191	103510	25021	5256	49114	929	27780	283	

Fonte: Inquérito à estrutura das explorações Agr'colas 1993

Interior North (*Trás-os-Montes e Alto Douro:* Tr M.A.D. e *Beira Interior* B. Interior) is mountainous with altitude above 700 meters. Here, the atlantic influence disappears and gives way to mountain ecology, with irregular temperatures. rainfall and atmospheric humidity throughout the year. The soils are very heterogeneous, but normally have a high agricultural capacity in the valleys and in some of the summits and slopes (favourable for permanent meadows and pastures). The soils are poorer on most of the summits and slopes of the mountains. Land exploration can be divided into two categories. In the valley, lands are private and are divided into small farms (landowners); in the hills, lands are communal (common grazing).

The agricultural system can be considered a "subsistence sub-category of crops and livestock production". A two year rotation of potatoe-rye uses the arable farm land. The "lameiros", that is, improved pastures, together with large areas of common land support livestock, particular cattle, but also sheep and goats in mixed grazing.

Northeast, is a region with a great diversity of environmental conditions, due in particular to the great differences in relief, altitude and rainfall. There are two main sub-regions, as follows:

- "Terra quente" "hot land" is of typical mediterranean ecology with cereal production, olive plantations, vegetables crops, and sheep production.
- "Terra fria de planalto" ‹‹cold tableland›› is influenced by continental ecology (cold winters, summers warm and dry and marked variations in temperature). Here the main commercial crop is wheat, together with pasture meadows for grazing and hay.

Coming down to the south and inland, the atlantic influence becomes weaker and the Mediterranean ecological influence increases, (except in a zone in the center of the country, region of the Valley of Tejo river), slowing down forage production, in absolute terms and altering its distribution throughout the year. The farms are fairly large and have a wide range of soil types. This has enabled the development

of many different patterns of land use with a preponderance of mixed farming systems, where the commercial crop is wheat and livestock systems are sheep and cattle for meat.

The total area of Portugal is 8,878,952 ha. Only 3,821,317 ha are arable from which 808,586 ha are in permanent grassland and 409,662 ha are temporary forages and pastures (Table 2). Further, 783,522 ha of grass and green crops are grown in rotation with agricultural crops (e.g. cereals, potato and leguminous cakes).

In 1994 Portugal had 9,350,400 million people. The evolution of the population and labour force is shown in Table 3. In the last 10-15 years, since accession to the European Union (EU) in 1980, some elements of Portuguese agriculture have undergone marked intensification, but, at the same time, depopulation of the more difficult rural regions took place (Table 4).

TABLE 2 Number of farms and arable land by farm size

	No. farms	Arable land (ha)	Temporary forages and pastures (ha)	Permanent grassland (ha)
Total	444,875	3,821,317	409,662	808,586
Farm size (ha)				
>0-<1	90,452	55,312	2,379	1,033
1 - <5	253,328	569,805	55,905	34,828
5 - <20	78,149	720,564	100,905	84,023
20-<50	13,659	413,313	55,011	65,333
>50	9,287	2,062 323	195,462	623,369

TABLE 3. Population and labour force ('000)

	1990	1991	1992	1993	1994
Total Population	9,808.20	9,815.30	9,345.50	9,350.50	9,350.40
Total at work	4,756.20	4,864.70	4,527.60	4,503.50	4,563.70
At work (%)	48.49	49.56	48.45	48.16	48.81
At work in Agricultural - Total	763.20	771.30	472.80	465.80	476.20
At work in Agricultural - %	16.98	16.66	10.89	10.95	11.20

TABLE 4. Population change by geographic area (1991-1993

Geographic areas	Total Area (ha)	Total population 1991	Total population 1993	Change 1991-93 %	Dens. Pop. 1993 (hab/Km²)
Portugal (Cont)	8,878,952	9,371,448	9,393,040	0.23	105.79
Entre Douro e Minho	899,631	2,998,999	3,075,510	1.28	337.64
Trás-os-Montes	1,228,203	473,940	465,830	-1.71	37.93
Beira Litoral	1,170,847	1,324,061	1,324,840	0.06	113.15
Beira Interior	1,195,722	397,480	388,970	-2.14	32.53
Ribatejo e Oeste	1,192,703	3,292,118	3,299,050	0.21	276.60
Alentejo	2,692,997	543,442	532,990	-1.92	19.79
Algarve	498,849	341,408	343,850	0.72	68.93

The numbers of cattle, sheep and goats kept in Portugal are shown in Table 5. In the last 5 years, there have been changes in the numbers of livestock although not all in the same direction. Thus, the number of dairy cows increased (25%) and the number of beef cows decreased. The changes in sheep numbers are not significant (there was a small increase) and the goat number declined significantly from 1992 to 1994.

TABLE 5. Numbers ('000) of livestock (1985-1994)

	1985	1990	1991	1992	1993	1994
Total Cattle	1,260[a]	1,375	1,417	1,345	1,322	1,262
Dairy cows	280	403	404	381	375	356
Beef Cows	287	265[a]	279[a]	235[a]	240[a]	250[a]
Total Sheep		3,360	3,380	3,348	3,305	3,416
Ewes		2,227	2,260	2,253	2,222	2,289
Total goats		857	862	858	836	419
Adults		616	622	619	605	593

[a]estimated

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BEEF PRODUCTION

In Portugal, suckler herds were always important relative to dairy herds. The evolution that took place in the past decades (Table 6) until the early 1990 resulted in

- an increase in the number of dairy cows
- a decline in native breeds.

BLE 6. Evolution of number of cattle ('000)

Year	Dairy Cows	Beef Cows	Total
1970	172		1,060
1975	200		
1979	226		1,165
1981	270		
1985	280	287	
1990	403	265	1,375
1991	404	279	1,417
1992	381	235	1,345
1993	375	240	1,322
1994	356	250	1,262

he Portuguese suckling herds can be divided in different categories:

ı the North there are very small herds of suckler cows of native breeds (in North litoral region one can nd GALEGA, MINHOTA and MARINHOA breeds, in the interior North, the BARROSÃ, IARONESA and AROUQUESA breeds occur and, in the Northeast, the MIRANDESA breed is found) ıd beef cattle production is an additional component of the family farm enterprise.

he production system is very complex due, in particular, to interactions between economic and social ircumstances. The farm is divided into several plots of land, some of them used for two crops in the ear, mostly for subsistence vegetables and green forages. The remaining plots are used as permanent r temporary pastures under a two-year rotation of potato and rye. The units have only a small number f cows (2-5), kept by the family semi-intensively. Grazing takes place in daytime and, at night, feeding ı cow-sheds is based on hay or green forages. Breeding takes place throughout the year.

'he method of breeding is hand mating where the bull is kept in a service center, which is the private ıroperty of one farmer, and whenever a cow is observed in heat she is turned in with the bull, and emoved immediately after a single service.

leifers are mated when they are mature enough to withstand the stress of parturition and lactation. The ıverage age at the first calving is about 30 months. Estimates of calving interval range from 11 to 13 nonths.

The productive life of cows varies from 10 to 14 years, during which they produce 9 to 12 calves. Fertility rate (number of cows bred that do not come back in heat within 200 days after mating) is 85%.

Weaned calves, sold for slaughter at 6 to 8 months of age at a live weight of 200 kg, are the main source of income for the farm but draught is also a very important product.

In the South, large herds of native (BRAVA, ALENTEJANA and MERTOLENGA) and exotic breeds and crossbred animals occur. Production is "typically" based on extensive farming.

The animals are kept outside throughout the year. Feeding is based on natural pastures and cereal straw. Occasionally, for a short period and when a severe feed deficiency occurs, cereal grains are fed. The breeding season varies according to seasonal local feed availability.

The method of breeding is pasture mating where the bull is allowed to run with the herd throughout the breeding season. Heifers are mated at the next breeding season after they are mature enough. The average age at first calving is about 36 months. Estimates of calving interval range from 12 to 14 months.

The productive life of cows varies from 8 to 10 years, during which they produce 5 to 7 calves. Fertility rate (the ratio of calves born to females of breeding age in the herd) is 75%. The beginning of the breeding season is February. The weaned calves are sold at 6 to 8 months of age and at a live weight of 180 - 200 kg to be fattened in others regions.

INDIGENOUS CATTLE BREEDS

Cattle breeding has ancient traditions in Portugal. The great diversity of cattle breeds in the country is typical mainly for the Northern areas. This is due to the different breeding conditions in the particular regions of the country regardless of its relatively small size.

Native cows:

- suckling cows ('000)
  - Alentejana.....20
  - Mertolenga 20

- suckling and draught cows ('000)
  - Mirandesa 40
  - Maronesa 10
  - Barrosã 30
  - Galega 7
  - Arouquesa 15
  - Marinhoa..... 5

- Lide (brava ou Ribatejana) 7

Exotic cows:

- dairy cows (The dairy population is Friesian).....± 350
- beef cows (suckler herds) Sallers, Limousin and crossbreds .....± 80

SHEEP PRODUCTION

fore assessing the trends in small ruminant production in extensive areas of Portugal, it is necessary understand the constraints imposed by the structure of sheep farming, by the priority for milk oduction and the traditional consumer preferences for lamb meat.

ıere are many different local breeds (14) and sheep production is more important in the highlands of e North and in the center of the interior of Portugal. Crossbreeding is widely practised, to increase meat oduction potential. The local breeds have an early onset of seasonal oestrus and, under natural nditions, lambing begins in October. In general the potential lambing period extends from October to ay and many farms have a much extended breeding season.

RODUCTION SYSTEMS

asically there are 3 production systems in Portugal:

ystem 1- Intensive management, lambs produced off grass, and conserved forages and finished on concentrates

ystem 2 - Upland farming (400 - 600 m), producing lambs off grass and some conserved forages

ystem 3 - This is the most common system. It involves hill sheep farming (above 800 m) in extensive areas of hill grazing, harsh weather and a wide variation in feed supply. The ewes receive no supplementary feeding stuffs. The tillage farmers use the sheep as scavengers on stubbles and weeds in cereal lands after summer harvest. During summer grazing is practiced under very arid conditions. In the autumn the flocks graze in oak forest areas. The lambs all remain with their mother during the grazing period. In this system the dog is very important against predators like wolves.

EVOLUTION AND PRODUCTION

In 1990 there was 2,227,000 ewes and a total of 3,360,000 sheep (INE, 1990). In 1995 the numbers reached 3,416,000 head. According to IMAIAA (1995) Portugal's accession to the EU resulted in a progressive increase in the national sheep flock, undoubtedly due to the premia payments as the Community has a deficit of this type of meat. Alentejo is the main region of production with 51.5% of the total output. Next comes the center and northern regions with 19.8% and 12.7%, respectively. Here, sheep are kept mainly for the milk production. With 314.2 t exported and 9747.6 t imported, Portugal is not self-sufficient in lamb meat. One of the greatest differences between EU sheep production systems is carcass weight. The Mediterranean areas of the EU produce the lightest carcasses in Europe (Table 7).

Another difference is the age at slaughter. In Mediterranean Europe generally, lambs are slaughtered at from 1 to 4 months old.

In terms of milk production, Portugal produces 87,906,000 litres of milk (INE, 1990), and the greater part is transformed into 14,651 t of cheese.

TABLE 7. Carcass weight in the Mediterranean area of the European Community

Country	Carcass weight (kg)
Greece	10,7
Spain	11,4
Portugal	10,0
Italy	8,6

COMMERCIAL CATEGORIES OF CARCASSES

For commercial purposes, lamb carcasses can be classified in the different countries of the Mediterranean region of the EU, according to weight, age, breed, diet type, conformation, fatness.

The following commercial categories are available to Portuguese consumers:

- *Borrego de canastra* - Lambs from milk producing ewes, 1 to 1.5 months old, 4 to 5 kg carcass weight
- *Borrego corrente* - Lambs 5 to 6 months old, with carcass weight not exceeding 10 kg
- *Ovino adulto* - Adult animals of variable age and carcass weight

CONSUMPTION CHARACTERISTICS

In Portugal, consumption tends to be mainly of young lamb carcasses, fresh or chilled, of light weight, rose color, tender and without fat.

The greater part of lamb consumption in Portugal is suckled lambs, weaned as early as possible to provide a long milking period. The usual weaning age is from 5 to 7 weeks at a liveweight less than 15 kg and a carcass weight (including head, kidney and kidney knob and channel fat) of 6 to 10 kg. This kind of lamb is favoured during the Christmas and Easter periods when there is high demand.

Farm prices are variable and depend on the local method of marketing, the relative supply of lambs and the demand at time of marketing.

CONCLUSIONS

Sheep production in Portugal is mainly light carcasses of 7-12 kg. This results from a combination of the systems of production and consumer preferences. The reasons for this are:

- most of the lambs are from extensive systems in which the main feeds for the lambs are milk and Mediterranean pastures
- the lambs, being from dairy breeds, cannot compete with milk production, which is the most important objective of the system
- the traditional requirement of the home market is for carcasses with a relatively low level of fat as consumers do not like fat carcasses

preference is influenced more by fat class than by conformation, so carcass conformation is less important than fatness

the meals are prepared according to a classical cuisine in which the traditional cooking methods are grilling or roasting the carcass whole

REFERENCES

IMAIAA) Instituto dos Mercados Agr'colas e da Indústria Agro-Alimentar, 1995. *Anuário Pecuário* 5. Ed. Ministério da Agricultura, Portugal.

nsituto Nacional de Estat'stica, 1990. Estat'sticas Agr'colas. INE, Portugal.

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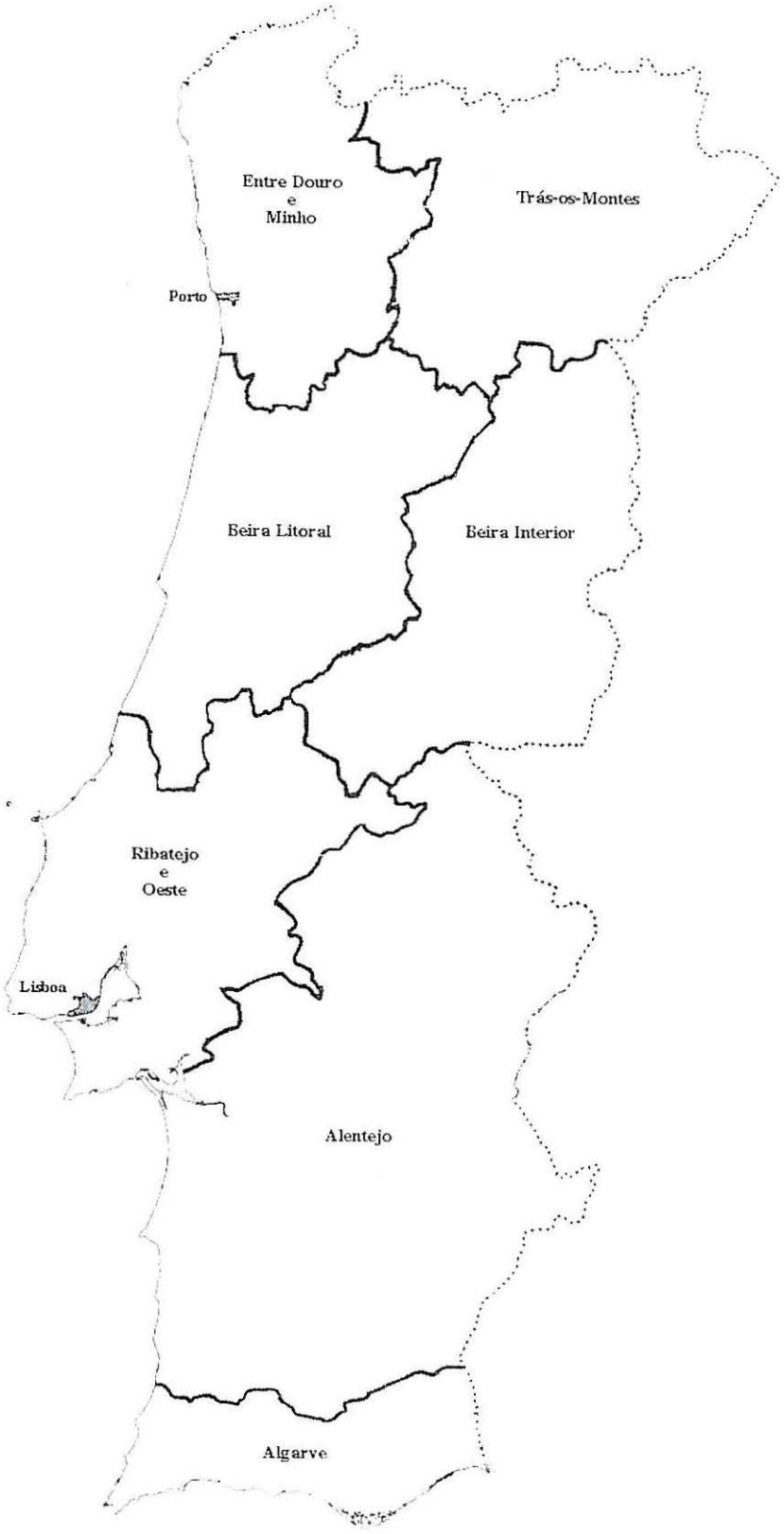
Figure 1- Portugal



TRENDS IN SMALL RUMINANT PRODUCTION IN EXTENSIVELY MANAGED AREAS OF NORTH EAST PORTUGAL

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SUMMARY

heep and goats are species naturally adapted to the optimal use of the poor and marginal regions. At resent, the tendency to rethink the systems of agrarian exploitation, is gaining in importance, especially 1 highly populated European Union countries with strong environmental policies, where they try to link 1e use of the soil to appropriate environmental practices. Today we are aware that the sheep and goat roduction systems, organized in small production units are a fundamental part of the development of 1ountain areas. On this basis the actions which should be taken are presented.

INTRODUCTION

hroughout the history of humanity, animal husbandry has not always had the same characteristics, but t was always intertwined with the vast variability in socio economic conditions and its importance omes from its place among mans sources of food supply. On the other hand, the domestication of nimals has always be visualised within a reference framework, where it articulates together with the ractice of sedentary agriculture.

he species that, from the archaeological data, are recognised today as fundamental in the first stages f domestication are ewes and goats, together with dogs, which in their wild state, had a very limited istribution. According to the existing data, breeding ewes and goats seems to have been the first step way from an economy that belonged exclusively to hunters and collectors. Thus, from a historical point f view, throughout the last ten million years, the evolution of sheep and goat production, in the editerranean area, was closely linked to the evolution of man.

he mountain shepherd, who was forced to move around looking for pastures and who was used to the ilitary regulations and the use of weapons to guide and to defend the flock, made use of these haracteristics to dominate the farmers and to make a living out of his work (Sergio, 1974). According o him the nature of the shepherds within the geographic environment of the mountains may be the xplanation for the *Lusitano* character. At this time, the whole of western part of *Iberian Meseta* was ccupied by the shepherds' tribes.

n this context, sheep and goats are species naturally adapted to the optimal use of the poor and marginal egions.

The economic development, the urbanisation of rural communities and the displacement of the rural population to the large cities, led to an intensification of the production systems, originating thus a great influence over the production systems of the small ruminants.

At present, the tendency to rethink the system of agrarian exploitation, has increased in importance, especially in highly populated EU countries with a strong environmental policy, where they try to link the use of the soil to appropriate environmental practices. The agrarian sector is forced to recognise this tendency and to adjust the systems of soil use.

According to several authors, two fundamental aspects should be considered:

1. Society has acquired a knowledge and awareness of the importance of the environment in the quality of life
2. There is increasing determination by the civil administrators of agricultural policies to control agricultural over production in the European Union (EU)

In an environmental context, this complements agricultural policy and determines the appropriate level of intensification agrarian systems and ensures adequate treatment of the landscape.

MOUNTAIN REGIONS

The mountain regions, particularly the Mediterranean ones have always been undergoing change. In the past they were regarded as regions where modern methods of animal production could not be practiced. In this context, its environmental and socio economic location, prevented the introduction of new methods without the preliminary analysis and preparation of the possibilities. This was one of the main reasons which led to the complete abandonment of the mountain's population, leading to the human desertion of those areas.

Today sheep and goat production systems, organised in small production systems, are a fundamental part of the development of these areas, especially in the following ways:

- economic: large areas with a low productivity potential can be exploited
- social and cultural: this type of production was and still is a traditional activity
- ecological and environment: the interaction between the forest and the populations of small ruminants which control the vegetation cover is essential to fire prevention and necessary to the landscape maintenance.

In any case, the successful use of grazing animals for the landscape maintenance, depends on factors such as the type of animal, the expected pasture yield and management of the pasture. The economic viability of sheep and goat production and its positive contribution to nature conservation is nowadays accepted by several sectors.

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vertheless, it is necessary to examine some problems which may prevent viability, e.g.

competition in the European sheep meat market, with a tendency towards lower prices
difficulties in generating an income which ensures the survival of a family
difficult social conditions which lead to the abandonment of the shepherds profession
problems of linking of the sheep and goat production with good landscape and other agricultural practices

CTIONS NECESSARY

he group of actions to be taken regarding small ruminant production cannot be an individual task, but ıust obey a wide and integrated programme of defined aims and priorities. Given this, the following roup of future actions are suggested:

resolution of animal management problems, with special emphasis on sanitary and prophylactic control of the main diseases
measures of social and economic assistance for the exploitation of the more abandoned regions
maintenance of the landscape is a service to society, so society should compensate those who carry it out
an increase in the pasture areas of the mountain and in the areas used formerly for cereal crops
organisation of mixed systems of forest and animal grazing
dialogue between the civil administration and the rural community as a vital way of fighting adversity
intensive cooperation between the agricultural and environmental administrative services as a pre-requisite to finding solutions to the problems of animal environment interactions.
effective promotion of the interests of the sheep and goat production, through the organisation of associations of selected animal breeders and commercial producers
a study of the situations where the local breed could be viably used, through the generation of models and simulation of situations which allow decision making on the future
the definition of the strategies for conservation of the local breeds
consideration of alternative situations (lowlands, upland and hill farming), according to the species and the systems, the exploitation of the pure breeds and the use of crossbreds
developing field scale experiments, with the participation of breeders associations, to test and validate at field level the data obtained from scientific research
definition of improvement strategies, suitable to the modalities of the production systems, for the characteristics linked to fertility, adaptability, viability, maternal aptitude, and general production
definition of the type of sheep and goat produced, taking into account the weight, stage of maturity and the consumers requirements
qualitative characterisation of the sheep and goat products as a way of defining its origin and the demarcation of production areas.

REFERENCES

ergio, Antonio. 1974. Obras completas - Ensaios. Tomo VII. Ed. Livraria Sa da Costa, Lisboa, pp 249.