

Country Pasture/Forage Resource Profiles

ALBANIA



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1. INTRODUCTION

Albania is in Southeast Europe, and more precisely on the western side of the Balkan Peninsula (see Figure 1); it is bordered by Greece to the south and southeast, by Macedonia and Kosovo to the east, and by Montenegro to the north. Its western border is the Adriatic and Ionian Sea. The Illyrians, the ancestors of the Albanian people, together with the Greeks, are the most ancient people in the Balkans. The Albanian language is unique and one of ten branches of the Indo-European family of languages. Agriculture began in Albania in very ancient times, in the Neolithic Age.

Albania is a small (see Figure 2), very mountainous country with a population of about 3.1 million people (according to the World Factbook, the July 2006 population was 3 581 655 with a growth rate of 0.52%); the capital Tirana has about 700 000 inhabitants. It has a total area of 28 750 km², of which 24% is agricultural land, 36% forest and 15% pasture and meadow. The remaining 25% is classified as other, which includes urban areas, about 135 000 ha of lakes and waterways and unused rocky and mountain land. The average agricultural land per capita at 0.2 ha is the smallest in Europe, even though agricultural land more than doubled from 1950 to 1990 due to drainage of marshland, terracing and cultivation of forest and pastures, and establishment of new irrigation schemes. Agriculture still provides the income base for most of the population and serves as an employment safety net. The rural population is estimated at about 54% of the total population while more than 60% of the labour force works in agriculture and related fields.



Figure 1. Albania in Europe

Land area, arable and pastoral areas

More than 75% of the total area is hilly and mountainous. The relief has a mean altitude of 708 m above sea level: more than double that of Europe. Nevertheless, Albania's topography displays great variability. Altitudes range from sea level along the Adriatic to 2 751 m at Korabi Mountain in the northeast of the country. Accordingly, the land used for agriculture is quite hilly, with only about 44% having a slope of less than 5%. Most arable areas are in the coastal plains and hills (see Figure 3). In addition, the Albanian southeast (districts Pogradec, Korçë, Devoll and Kolonjë) is distinguished by the presence of an extensive arable-agricultural area on high plateaux 700–800 m above sea level. Also more than ten valleys of main rivers flow from east to west side into the Adriatic and Ionian Seas. The amount of arable land greatly increased between 1950 and 1990, with 17% of this increase gained through land reclamation, and the rest by pasture and forest conversion. Shallow soil and low fertility of the converted lands could not justify the investments made and they began to suffer from serious erosion shortly after they were opened up. For these reasons, 19% of arable land is in the mountains, 37%



Figure 2. Map of Albania

Source: The General Libraries of The University of Texas at Austin

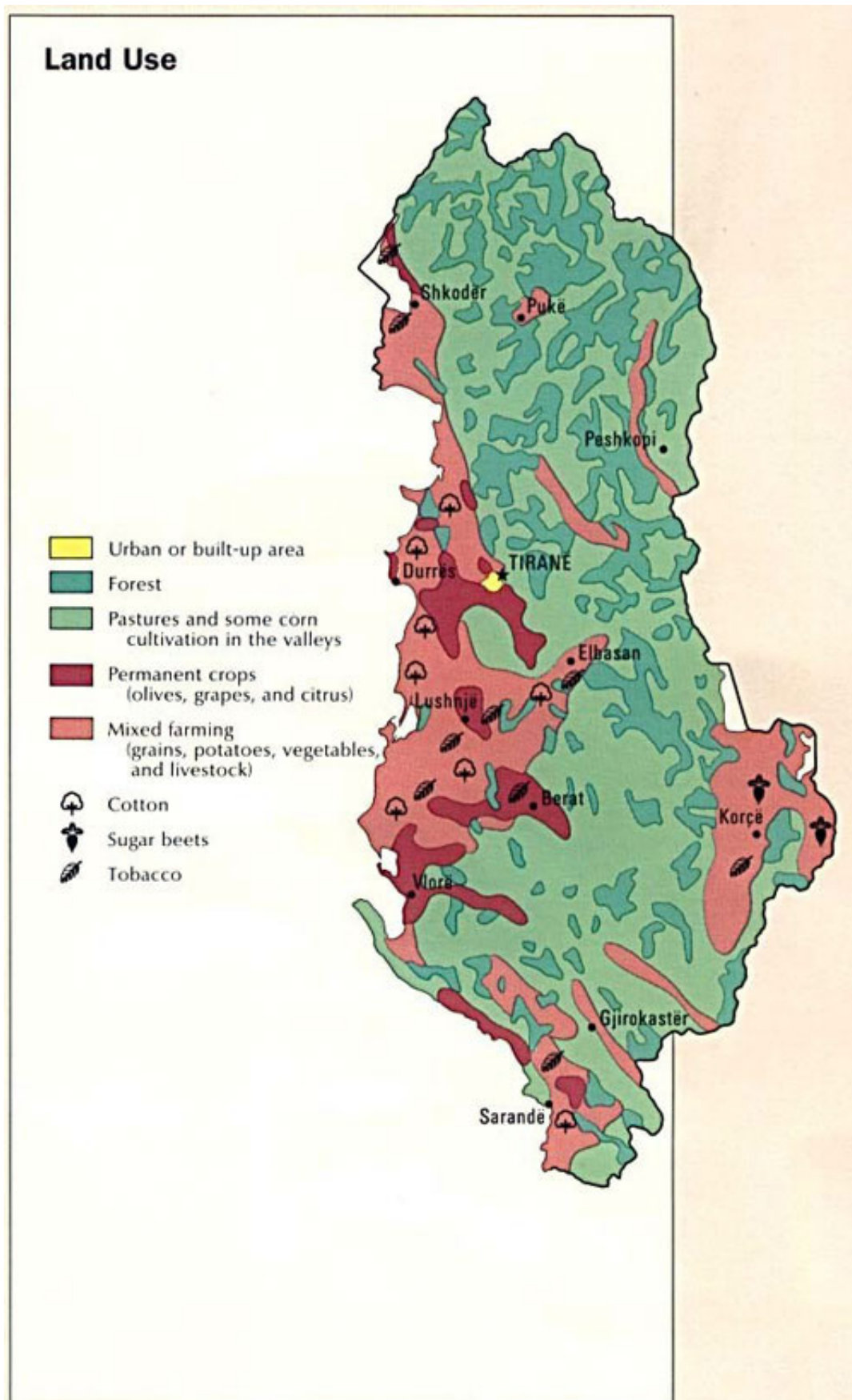


Figure 3. Land use

in the hills and 44% in the plains. In general, the arable land at high elevations is of low fertility. Until 1938, pastures and meadows made up 44% of Albania's territory and were considered a basic national resource. An important part of these pastures and meadows containing plentiful herbage were unique for livestock raising, but these were subsequently converted to arable land. The main pastoral areas are now in the north and northeast as part of the Albanian Alps where the climate is wet and cold, and in the southeast and south with a dry and warm climate.

Ruminant sector

Livestock rearing is a traditional economic activity in Albania. Before the Second World War it was much more important than crops. Nowadays, it accounts for 47% of agricultural production, a contribution that is higher than in other Mediterranean countries. Albanians have relied primarily on animal husbandry, which is attributable to the favourable pedoclimatic conditions in the region. In the twentieth century there were three different situations in Albania's livestock structure: (a) before the Second World War it was dominated by sheep and goats, raised mainly for milk and, to a lesser extent, for meat and wool. On average there were three of those animals per head of population; (b) during the 50 years of the communist regime the number of sheep and goats increased by only 250 000 or 10%; (c) this compares with 2.6 fold increases for cattle and 5 and 8 fold increases for pigs and poultry, respectively during the first ten years of the democratic system. However, livestock yields for the three periods (see Table 1) remained below their potential and below yields in neighbouring countries (also see Table 3 for various livestock data).

Table 1. Livestock yields over time

	1938	1990	2002
Cow milk (litres /head)	280	1 480	1 950
Sheep milk (litres /head)	39	41	48
Goat milk (litres /head)	55	73	87
Wool (grams/head)	900	1 600	2 300
Eggs/chicken	54	99	145

Cows. Before the Second World War, cows were primarily used as draught animals. In comparison with 1938, the number of cows increased 2.2 times and in 2002 they increased 3.9 times. Milk and meat production, however, increased more, 5.5 and 8.5 times respectively. This increase reflects the significant efforts that have been made both by state and private organizations to improve the breeds and their feeding.

Sheep. Sheep have been traditionally very important to Albanian peasants. In 1990 and 2002 sheep numbers increased by 5% and 21% respectively compared with 1938. Milk production increased much more during this period but the milk yield per ewe remains very low (48 litres/head). Sheep depend entirely for feeding on grazing lands, especially pastures, both in winter and summer. In summer they also use arable land, after harvest. Flock size is small (about 20–30 animals), but in some areas larger flocks can be found belonging to one or more farmers.

Goats. Goat numbers fluctuated over the years as for sheep. Milk production remained the same during the same periods reflecting again the breeding programmes that are applied, especially with the introduction of the alpine breed. Milk yield per doe remains low (87 litres/head). Goats also depend entirely for feeding on grazing, especially shrublands and coppiced forests. Fodder collected from lopping of oak trees is mainly used in winter.

Equidae. The numbers of donkeys, mules and horses are relatively small and they do not compete with sheep and goats.

The relative importance of livestock production has increased steadily since the socio-economic reforms of the last decade of the twentieth century, with its contribution increasing from 42% in 1992 to 50% in 1999. Livestock production fits well into the smallholder farming system and has an important social security function. Households aim to produce enough milk and meat for domestic consumption, with a limited surplus sold where possible in the local market or to the increasing number of small processing plants. The small-scale nature of livestock production is illustrated from the 1998 agricultural census, which reported that about 302 000 households owned one or two cows; only 5 350 households

owned more than two cows, and just 70 households owned more than ten cows. Livestock also provides transport for people and goods and is often used for land preparation. Other factors explaining the increase include: the availability of land suited for forage; the possibility to increase numbers without large expenditure; availability of labour for livestock care; ability to derive regular income from livestock products; and a growing demand for livestock products.

Cattle numbers are now about 4% and sheep numbers about 22% higher than in 1989. Cows now comprise more than 60% of the cattle herd compared with 40% in 1989, reflecting the increasing importance of milk production and greater reliance on forage-based production systems. Efficiency of production has also improved, as evidenced by milk yields increasing from 1 500 kg/cow in 1992 to 1 800 kg/cow in 2000. Overall, from 1989 to 2000, milk and meat production figures increased by 80% and 33% respectively, egg production more than doubled, and honey production increased more than ten-fold.

Export and import markets. Albania's main agricultural exports are tobacco and fish products. The main agricultural import is wheat. The main trading partners are neighbouring European Union countries. The share of exports in GDP amounted to 10% in 1999, which is low compared to neighbouring transition countries. The composition of trade has changed notably and agricultural imports shifted towards primary products. The proportion of agricultural imports increased from around 22% in 1993 to 27% in 1999. These data suggest a trend over the last decade away from market production towards subsistence agriculture and a growing dependence on agricultural imports. The ratio of import/export of agricultural and food products was 10:1 (average of years 2000–2002). The value of agricultural exports and imports in 2002 was (in percentage): crops 38 and 26, livestock 18 and 9, agro industry 37 and 63, fishery 7 and 2. FAO in May 2004 indicated that cereal output was expected to be about average in 2004 after a relatively favourable growing season up to that point. Wheat output was forecast at about 285 000 tonnes and that of maize at 195 000 tonnes. With this level of production, the cereal import requirement for 2004/05 was expected to remain about the average of the past five years at around 370 000 tonnes.

Farming sectors

Under Albanian law, land has been granted to the owners as a family unit; it has been allocated to citizens and land titles have been issued, distributed, and registered for approximately 80% of all rural land. Issues of concern are small farm size and high level of fragmentation, with farms generally consisting of two to four or more widely scattered plots. Since 1991, the structure of agriculture has changed radically. Instead of large farm units, there are now 467 000 peasant families owning about 546 000 ha or on average 1.17 ha per household. About 70% of farms have less than 1.5 ha of land. In general, these farms resemble each other because they grow the same crops (cereals, vegetables, potatoes, beans, tobacco and forage). In addition, they have some vines, fruit trees, olives and citrus. Almost every family has 1–2 milking cows, 5–6 sheep or goats, 10–20 chickens, some swine, and probably transport animals. Only a limited numbers of farms, mainly in coastal plains or close to suburban areas, practise a more intensive agriculture that allows them to produce for the market.

Marketing. Marketing conditions for livestock products are poor. Cow milk is mainly used for drinking and only a small production is processed for yoghurt. Due to the lack of organized collection networks and processing centres, a relatively small proportion of it is marketed. The remaining quantities are used within the family or processed into yoghurt. Conditions for meat are similar; calves are sold in the village or in the nearest urban centre. Sheep and goat milk are mainly used for cheese, very little for direct consumption. For each district there are 10–20 processing centres, which collect 40–70% of the milk of the area. The other 30–60% is kept by the producers to make their own cheese products. The situation is the same with the lambs and kids. A surplus of lambs in the market keeps the price very low. Farmers try to sell their products directly to consumers (families, restaurants, etc.), sometimes without success. Marketing of livestock products in Albania is a big problem. Farmers claim that their products are biological (organic) and they are right, but still market outlets are few. If this is not solved soon, many young farmers will abandon stock rearing and follow other activities that ensure a better income for them, or will emigrate.

2. SOILS AND TOPOGRAPHY

Major topographic features

Albania is mountainous with more than 75% of its area being hills and mountains (see Figure 4). About 30% of the territory is between 0 and 300 m above sea level, 42% from 300–1 000 m and 8% higher than 1 500 m. The Republic encompasses a total area of 28 748 km² of which 24% is agricultural land, 36% forest, 16% pastures and meadows, and 24% unproductive land, urban land, inland waterways, etc.



Figure 4. Relief map

Major soil types

The coastal zone to the west along the Adriatic sea, mostly occupied by fertile alluvial soils, is replaced by the submountainous zone in the centre, covered by hills with mainly flysch (sandstones and schists) and marls, while most of the eastern part of the country is covered by high mountain massifs mainly consisting of limestone.

In regions with hard rocks (carbonates, etc.) the relief has rugged forms, sharp peaks, steep slopes and narrow valleys, which, in the limestone zones, assume the form of canyons. In regions with soft rocks (flysch, molasses [a soft Tertiary sandstone], etc.), the relief has gentle forms, rounded peaks, moderate slopes and relatively wide valleys. Karst relief developed in limestone and gypsum terrain is very widespread. Relief of glacial origin is found in a few instances at altitudes of 1 500–1 800 m. The soils of Albania are varied and create special zones according to the climate, flora, relief, etc. The soil zones are divided into four according to their altitudes:

- a. Grey-brown soils occur at altitudes up to 600 m. They include the zone of coastal lowland and hills, which make up about 15% of the country. Of these soils, 70% are under crops. In the lowland zone there are 84 000 ha of alluvial soil and 15 000 ha of saline soils.
- b. Brown mountainous soils occur in the interior of the country, at altitudes from 600 to 1000 m. They make up 38% of the total area and 40% of the arable land.
- c. Grey forest soils occur at altitudes from 1 000 to 1 800 m and make up 15% of the total land area, of which 10% is cultivated.
- d. Mountain meadow soils occur at altitudes of 1 600–2 600 m and make up 10% of the country area.

Little fertilizer has been used since 1991, resulting in a fall in organic content, nitrogen and potassium compared with 20 years ago. Wasteful cultivation practices and poor soil conservation practices have also caused soil degradation. Approximately 200 000 ha have been affected in this way, most of it in the potentially highly productive coastal zones. A considerable amount of pasture was converted to crops and the pasture area has decreased from 700 000 ha in the 1960s to about 400 000 ha today, resulting in reduced fodder supply and an increase in marginal arable land. Soil erosion has also increased, particularly on the less fertile soils and in the hilly and mountainous areas and appears: (a) as surface erosion, (b) as coastal erosion, (c) as riverbank erosion, (d) in the transportation of silt, and (e) in the impoverishment of soil fertility. The main factors causing erosion are pedoclimatic (altitude, mountainous terrain, rainfall and bare slopes) and human (deforestation, irrigation with flow, a considerable decrease of investments to maintain agricultural land, and fires in pastures and forests). A study by the Albanian Research Institute of Soil estimates that 20% of Albanian soil is likely to be eroded at a rate of more than 5 tonnes/ha/year; 70% of territory is eroding at 30 tonnes/ha/year; only 10% of the soil area is less affected by this phenomenon. This report shows that about 100 000 ha of agricultural land are currently in the process of desertification caused by poor vegetation cover (World Bank and FAO, 2002).

3. CLIMATE AND AGRO-ECOLOGICAL ZONES

Climate

With the sea to the west and mountains to the east, Albania lies between two climatic areas: the Mediterranean coastal zone and the Continental internal zone. Pastures and forage production are hindered by some ecological limits: the concentration of pastures and forests is in the highest zones (1 200–2 600 m), comprising 13% of Albanian territory; also a lot of marginal lands; the absence of possibilities and efficacy to cultivate forages higher than 1 000 m above sea level; the lack of precipitation at the right time with optimal temperatures for the good growth of forages, and the excessive and extended dryness in summer (Shundi, 1996). Climatic conditions vary greatly based on locations in four zones:

- a. The southern part of the coastal plain is characterized by a relatively dry Mediterranean climate, hot summers with an average temperature of 26 °C. Winter is mild and wet with an average

temperature of 9.8 °C. The average annual rainfall amounts to 800–1 300 mm, but only 12% of the total falls in the period June–September. In this area many crops are grown (cereals, industrial crops, vegetables, forages, etc.), also citrus and olive trees.

- b. The central and northern part of the coastal plain is 180 m above sea level. It also has a Mediterranean climate with a hot dry summer. The average summer temperature is 23–24 °C. Winter is wet with the possibility of frost. Rainfall is higher especially in the north where it can be as much as 2 000 mm. Climatic conditions are suitable for crops such as maize, vegetables, forages, vines and fruit trees.
- c. The hilly zone extends from north to south and lies 600 m above sea level. River valleys extend from east to west through the area. The average temperature is 3–4 °C lower than in coastal zones, with frequent frosts. It is suitable for growing wheat, potatoes, sunflower, tobacco, sugar beet, vegetables, vineyards and fruit.
- d. The mountain zone, 800 m above sea level, is characterized by a continental climate with rainfall of up to 600–1 000 mm. The northern part of this zone, in the Dinaric Alps, has the highest rainfall total with 1 500–2 500 mm. The highest temperature in July is about 25 °C; minimal temperatures in winter are to –20 °C. Forests and pastures cover most of the area. Areas of wheat, forages, vegetables, potatoes and fruit have expanded.

Albania is divided into four natural regions; it is like a great amphitheatre with numerous vertical extensions, where at intervals of 120–150 km the altitude reaches up to 2 750 m. Average annual rainfall in Albania is 1 300–1 400 mm and 80% of this falls at November–March. The sum of annual active temperatures (above 10 °C) varies between 3 500 and 5 500 °C, the hours of sunshine vary from 2 100 and 2 300 a year. July and some times August are the driest months, whereas November–December are the wettest ones. The driest area is the southeast part with 600–700 mm of rainfall annually.

Agro-ecological zones

Based on pedoclimatic conditions and topography, three agro-ecological zones are distinguished that have similarities with the four climatic zones described above. Albania has a vertical position, being longer than it is wide; it is longer from north to south (335 km) than it is wide from east to west (148 km), i.e. in the ratio of 2.3 to 1. In this direction, from north to south, there are also three strips of agro-ecological zones:

- a. **The lowland zone** alongside the Adriatic Sea where plains range from 50 to 200 m above sea level. Alluvial soils dominate here and also there are different spots with saline soils. About 80% of annual rainfall (about 900–1 200 mm/year) is concentrated during the October–March period. These pedoclimatic conditions help for good cultivation of most crops; irrigation is necessary during summer.
- b. **The hill zone** is between the lowland and mountain zones at altitudes from 100 to 900 m and average rainfall is about 800 mm/year. Here field crops and fruit trees are grown but there is also low forest and shrubs.
- c. **The mountain zone** where the summer is warm and the winter is cold, with more than 100 days per year with frost. Annual rainfall is from 900 to 1 500 mm with considerable snow. Cereals, especially wheat, barley and rye, are grown, and fruits (apples, plums, pears, etc.). In this zone forests and pastures dominate.

In Albanian agriculture there are substantial regional differences that reflect variation in climate and terrain, access to agricultural service and inputs, development of markets, and different levels of infrastructure development. To explore these differences, the districts have been grouped into four broad regions mostly representing the different agro-ecological zones (see Table 2); this grouping does not correspond exactly with the agro-ecological zones since many districts contain more than one zone. As would be expected, there is less agricultural land and more pasture and forest in the more mountainous regions; holdings also tend to be smaller there, although the farmers have access to unallocated pasture and forest land for grazing. Cropping patterns also differ; the most notable trend is the large percentage of non-cropped agricultural land in the more mountainous regions. Much of this land, which is often steep, stony and infertile, was cultivated during the years 1960–1990 of the previous regime. Some of it is now used for rough grazing. Tree crops are grown in all regions; they are particularly important in the intermediate zones where olives, grapes and various fruits are widely grown.

Table 2. Agricultural structure in the four zones and their respective districts (year 2000)

Structure	Total	Lowlands (Durrës, Fier, Kavajë, Laç, Kuçovë, Lezhë, Lushnje, Peqin)	Intermediate (Berat, Delvinë, Elbasan, Krujë, Mallakastër, Sarandë, Shkodër, Tiranë, Vlorë)	Southern Highlands (Devoll, Korçë, Kolonjë, Përmet, Pogradec, Tepelenë, Gjirokastër)	Northern & Central Mountains (Bulqizë, Dibër, Gramsh, Has, Kukës, Librazhd, Malësi, Mat, Mirditë, Pukë, Skrapar, Tropojë)
Land structure					
Total land area (ha)	2 874 800	328 969	895 560	659 458	990 813
% Forest + pasture land	51	19	43	56	66
% Agricultural land	24	61	26	21	13
Cropping structure					
Total agr. land	629 293	201 989	229 221	136 734	131 349
% Tree crops	17	13	25	13	15
% Cereals	26	29	23	26	24
% Forages	24	28	25	19	19
% Other crops	11	16	10	9	7
% Not cropped	23	14	16	34	36
Agricultural holdings					
Total number	466 670	120 197	123 542	62 237	122 306
Total holdings area (ha)	457 581	159 886	117 941	68 441	61 900
Area per holding (ha)	0.98	1.33	0.95	1.10	0.51
Crop input use					
% Irrigated agr. land	45	68	44	27	31
Fertilizer use (kg/ha)	185	275	158	80	111
Tractor avail. (ha/trac)	97	74	125	127	133
Crop production					
Wheat yield (tonnes/ha)	3.1	3.4	3.3	2.5	2.4
Maize yield (tonnes/ha)	3.6	3.9	4.5	2.3	3.3
Cereal prod.(kg/holding)	1 212	1 705	1 260	1 324	748
Forage yield (tonnes/ha)	28	33	24	18	19
Forage prod. (tonnes/holding)	9.6	17.4	10.4	7.5	3.7
Grapes (t/ha)	7.1	10.6	8.3	4.5	6.1
Fruit (kg/tree)	15.5	18.8	14.6	12.4	13.8
Livestock numbers + outputs					
Cattle (no. /holding)	1.6	1.7	1.9	1.5	1.6
Milk yield (kg/holding)	1 609	2 130	1 862	1 538	1 113
Sheep + goats (no./holding)	6.5	2.3	8.7	12.8	7.3
Milk prod. (kg/holding) ^[1]	2 301	2 536	2 368	2.029	1 328
Meat prod. (kg/holding) ^[2]	241	237	259	223	216

Source: Agriculture Statistics Yearbook, 2000 [See Ministry of Agriculture and Food, 2000]

¹ from all livestock

² liveweight, from all livestock

Input use is lower in the mountain zones than in the plains, which together with poorer pedoclimatic conditions is reflected in lower crop yields and production.

Cattle are an important part of the household economy in all regions, although numbers and productivity are lower in the mountains due partly to limited availability of quality forage. Sheep and goats are generally more important in hilly and mountain areas than in the lowlands owing to the availability of grazing, although flocks tend to be smaller in the mountains than in the hills. Despite the greater focus on livestock in the hills and mountains, meat and milk production per holding is relatively low partly due to the poor condition of the public grazing resources as well as limited quality forage production on arable land. However, the importance of livestock in the more marginal areas should not be underestimated.

4. RUMINANT LIVESTOCK PRODUCTION SYSTEMS

Table 3 gives data for various livestock numbers, meat, milk and wool production as well as cattle, meat and milk imports for the period 1996–2005. The data were taken from FAOSTAT.

Traditional systems (pastoral and agropastoral, mixed smallholder, landless systems)

Traditional systems continue to be the basis of rearing animals, especially sheep and goats. Nowadays the cattle breeds are mixed. During the period of normal pasture growth (April–October) they graze; when the vegetation is limited they are stall fed.

In Albania, the political-economic system changed in 1991 from a communist dictatorship to a capitalist democracy. Land ownership also changed along with grazing rights and livestock and the management systems in agriculture. Livestock production systems are not yet well defined and stabilized. In the traditional systems the following systems can be distinguished.

Pastoral system

The pastoral system includes transhumance and sometimes nomadic herding. The natural environment of Albania has two important implications for forage production. A positive one is the great variety of plant species and habitats that grazing animals can use resulting in an increased quantity and, especially, quality of animal products. A negative one is the feed gaps, a big one (3–6 months) in the hot and dry summer when herbaceous plants are dormant, and a small one (2–3 months) in winter owing to the low temperatures when plants grow slowly or completely interrupt their growth. This difficult problem was solved by the Albanian farmers over the centuries through transhumance, by moving their animals from the lowlands, where they were kept in winter, to the summer pastures in the uplands and vice versa. This great tradition, also practised in other Mediterranean countries, has declined since 1990 owing to the emigration of people to the urban centres and abroad as well as to the unwillingness of young farmers to move their animals to the mountains any more, thus increasing grazing pressure on the winter pastures. An additional more important reason is the fact that, following the agricultural reform in the early 1990s, which involved the division and privatization of land in the plains used in the past as winter pastures, the mountain farmers have difficulties in contacting the numerous owners in the lowlands to organize their transhumance. However, in the last five years, the number of owners with a hundred and more sheep is increasing, so transhumance is becoming more effective to practise. The summer-mountainous pastures are not so far from winter-lowland pastures and usually most of the transhumance takes place within the same district or to the neighbouring district. Transhumance time is only one day when it is done using trucks or 3–10 days when the animals walk.

Table 3. Albania statistics for livestock numbers, meat, milk and wool production, and cattle, meat and milk imports for the period 1996–2005

Item	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Cattle nos (thousand)	806	771	705	720	728	708.4	690	684	654	700
Goat nos (million)	1.3	1.2	1.1	1.1	1.1	1.0	0.9	1.0	0.9	1.0
Sheep nos (million)	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.8	1.8
Beef and veal prod. (thousand Mt)	32.6	32.5	32.0	33.7	35.9	35.3	37.6	40.0	39.6	39.0
Sheep and goat meat prod. (thousand Mt)	16.6	15.7	16.7	18.1	19.4	19.4	19.4	19.4	21.4	20.5
Cow milk prod. (thousand Mt)	894.6	707.2	721.9	761	807	840	878	904	917	930
Wool prod. (thousand Mt).	3.2	2.9	3.0	3.0	3.4	3.3	3.3	3.1	3.3	3.3
Cattle imports (head)	231	3	692	330	1110	287	6827	27301	10975	n.r.
Poultry meat imports (thousand Mt)	18.9	7.1	3.2	24.1	13.7	20.8	31.7	23.7	20.8	n.r.
Beef and veal imports (thousand Mt)	6.1	2.6	3.0	1.8	1.1	1.5	3.7	3.9	6.2	n.r.
Milk equivalent imports (thousand Mt)	31.4	9.9	10.4	22.0	15.3	17.6	28.5	25.6	27.5	n.r.

Source: FAO statistical database 2006; n.r. no records

Agropastoral

This is now more common than the pastoral system because in autumn-winter-spring the animals graze a combination of arable land and small remaining winter pastures in the lowlands; while from mid-May–mid-September grazing continues in mountainous pastures.

Mixed smallholder

This system is now typical. It is connected with the number of animals/flocks. Generally sheep flocks are small (about 20–30 animals), but in some areas larger flocks can be found belonging to one or more farmers (i.e. combined flocks with several owners); some goats are mixed with sheep in the same flock, but in most areas there are pure goat flocks; each farm keeps 1–2 cows and the typical stock farmer raises 10–15 cows for milk or 30–70 calves and heifers.

Socio-economic limitations

Pasture legislation was part of land reform privatization that included: (a) the development of a comprehensive legal and regulatory framework for land administration and land market development; (b) the establishment of an Immovable Property Registration System for real property titles and registration; and (c) a comprehensive, donor-supported programme to provide first time registration to new land owners. In some areas local privatization initiatives preceded the formal land privatization process and land was distributed to individuals and families without formal Government sanction. The decision not to allow restitution for rural land does not apply to urban land, and thousands of competing claims in urban areas are further clogging the courts and slowing the issuance and registration of urban titles. This differing approach for rural and urban land presents a problem for security of title in rural areas surrounding the major urban centres where land is rapidly being reclassified as urban. These issues are leading to a great deal of uncertainty around land ownership and are increasing the risks of investing in land and using land to secure financial transactions. Other issues of concern are the small farm sizes and high level of fragmentation with farms that are an obstacle for commercial production, for mechanized cultivation etc. One initiative is using market transactions and information to engage communities in dialogue on the benefits of consolidation. The degradation of natural resources in Albania is an important long-term constraint to sector development. Problems include: (a) uncontrolled deforestation; (b) large livestock numbers and consequent overgrazing, particularly in mountain areas; (c) soil erosion and degradation through cropping on marginal lands, especially on steep slopes before the collapse of the old regime in 1991; (d) loss of scarce and productive arable land through rapid urbanization; (e) degradation of water resources and catchments; and (f) increased vulnerability to flood damage.

5. THE PASTURE RESOURCE

Grazing lands

A large part (36%) of Albania is classified as forests, which include not only high and coppice forests but also shrublands. The second major land use category (24%) is arable land and the third is pastures, which are largely uncultivated areas covered mainly by herbaceous vegetation and small shrubs; a small but very important category of pastures is hay meadows. All the other lands such as rocky areas, water bodies and settlements are lumped together in a single group that occupies 25% of the country. Under the Albanian National Forest Inventory (ANFI, 2001) a new land cover-use map has been produced which allocates different proportions to the various categories from the above official ones. More specifically, forests were found to cover 53% of Albanian territory, pastures and meadows 17% and other areas 9%. Since this map has not yet been officially accepted, this Profile reflects the official agricultural statistics (see Table 4).

Pastures and meadows

Officially, only pastures and meadows are considered as grazing lands in Albania. They are distributed throughout the country and divided into two groups depending on the season of use: winter pastures, in

the lowlands and used in winter including spring and autumn; and summer pastures, in the mountains and used in summer for 4–6 months (May–October). The latter include all pastures in the sub-alpine and alpine zones and amount to about 61% of the whole area. Dominant herbaceous species in winter pastures are several annual grasses and legumes as well as perennials such as *Dactylis glomerata*, *Festuca ovina*, *Poa bulbosa* and *Lolium perenne*; while in the summer pastures only perennials such as *Poa pratensis*, *Phleum montanum*, *Nardus stricta*, *Trifolium alpestre*, *Trifolium repens*, etc. are found. Improvement of state pastures includes watering points, rock collection to increase the productive area, shrub cutting, removal of weeds and fertilization (see Table 5). These improvements also include plantations of *Robinia pseudoacacia* for fodder.

Pasture condition

Pastures are in relatively poor condition; this is based on the following criteria:

- there is a large proportion of unpalatable plants or weeds, both herbaceous (e. g. *Asphodelus microcarpus*, *Urginea maritima*, etc.) and woody (e.g. *Phlomis fruticosa*, *Rubus* sp., etc);
- a large proportion of pasture is bare soil; and
- there is conspicuous accelerated erosion, accompanied by landslides, especially in areas of flysch and marls. There is no erosion in pastures on karst areas, but a large proportion of the ground (almost 40%) is bare rock.

As a result of their condition, productivity of pastures and meadows is low. Under good soil conditions winter pastures yield no more than 1 500 kg DM/ha, and summer pastures no more than 1 000 kg DM/ha. Under fair to poor soil conditions, which predominate, the yield of forage is substantially less; the average herbage production is no more than 600 kg DM/ha or even much less (227 kg DM/ha) (USAID, 1996). Pastoral wildfires are related to the degradation of pastures. The new Pastures and Meadows Law prohibits burning of pastures and meadows but allows the use of fire in special cases under the authorization of the DGFP. This is a good provision since it may help initiate the use of fire for pasture improvement.

Grassland condition assessment

Pasture condition refers to grassland health or current production in relation to its potential. In Albanian pastures three classes are identified on the basis of the desirability to livestock of plants making up the rangeland vegetation, the presence of litter on the soil, the height and crown cover of the shrubs and the degree of soil erosion. They are as follows:

Class

Characteristics

1. Good

- at least 70% of plants are desirable

Table 4. Major land uses with their sub-categories

Land use	Area (in ha)	As percentage of the total
Arable land	699 293	24
Crops	578 374	83
Orchards, vineyards and olive groves	120 954	17
		100
Forests	1 026 410	36
High	373 142	27
Coppice	266 606	31
Shrublands	221 217	26
Protective	165 445	16
		100
Pastures and meadows	445 345	15
Meadows	4 390	1
Uncultivated pastures	403 691	91
Cultivated pastures	37 254	8
		100
Other areas	703 752	25
Total	2 874 800	100

Source: Agricultural Statistics Yearbook (2000) [See Ministry of Agriculture and Food, 2000] and ANFI (2001).

Table 5. Number of watering points and area improved since the implementation of the Albanian Forestry Project

Improvements	Unit	Year			
		1999	2000	2001	2002
Improved area					
State pastures	ha	-	-	-	160
Communal pastures	ha	22	73	68	141
Watering points					
State pastures	Number	3	29	23	23
Communal pastures	Number	7	31	66	61

Source: DGFP (2003).

- more than 2/3 of the ground covered with litter
 - shrubs less than one metre high and with less than 40% cover
 - no evidence of erosion
2. Fair
- at least 40% of plants are desirable
 - 1/3 to 3/3 of the ground covered with litter
 - shrubs less than one metre high and with less than 70% cover
 - no evidence of accelerated erosion
3. Poor
- less than 40% of plants are desirable
 - less than 1/3 of the ground covered with litter
 - shrubs more than one metre high and with more than 70% cover
 - evidence of accelerated erosion

Forests grazing management. In Albania, high forests are pure or mixed and consist of mainly beech, black pine, oak, maritime pine, fir and other broadleaves and conifers. They are managed in the classical way by thinning or clear cutting and natural regeneration. Coppice forests are also pure or mixed and consist mainly of oaks and beech. They are managed for firewood but also serve as fodder through lopping of oak trees. Shrublands consist of several species both evergreen and deciduous (e. g. *Arbutus unedo*, *Erica* spp., *Quercus coccifera*). They are used for firewood and grazing.

Officially, forests are not considered as grazing lands. However, both shrublands, coppice and high forests are grazed. The only areas where grazing is not allowed are the “protected forests” and areas, which have been delimited in the high and coppice forests. Lopping of oak trees for fodder, especially for goats, in winter is common practice at least in coppice forests. Also, in some shrublands, such as those dominated by *Quercus coccifera*, grazing is the only practice applied. Fire is sometime used to open up these shrublands and make them suitable for sheep grazing.

Arable land grazing. Land ownership is about 0.2 ha per capita on average, which means that there is no real incentive for cultivation, so a great part of the arable lands is underutilized and grazing is the main activity. Even the cultivated area is grazed after the harvest. Straw is collected and stacked for use in winter. In addition, forage and hay crops are grown (about 40% of the total cropland: lucerne, maize, annual clovers and ryegrasses, etc.). It is a common practice to graze under trees after the fruit harvest.

Fodder supply and grazing. The developing livestock sector makes a considerable demand on feed and fodder supplies. Possibilities for expansion of natural pasture are limited, so increased feed must come from improved production of fodder such as lucerne, maize and other grasses, and improved utilization of industrial by-products such as olive cake, bran and soybean meal. Forage crops are now grown on 165 000 ha, or 40% of the cropped arable land, with lucerne comprising about two-thirds of this area. Most is harvested by hand and there are problems with weeds and poor storage of hay. More emphasis should be placed on measures to improve forage quality, enhance management and feeding practices and increase availability of clean seed. Grazing resources including pasture, forest and some agricultural land are fundamental for livestock raising. But many pastures and forests have degraded significantly over the last five to ten years, particularly in land close to communities where overgrazing and overcutting of wood have resulted in reduced productivity and soil erosion.

Legislation and government for livestock fodder and pastures

The Law on “Pasture and Grazing Land” (No. 7917 of 13 April 1995) is for land covered with grass and shrubs that is used for grazing and mowing and belongs neither to the agricultural land fund nor to the forest fund. It divides pastures and meadows into:

- a. State-owned pasture lands amounting to 38% of the whole area that are administered by the Directorate General of Forests and Pastures (DGFP) in the Ministry of Agriculture and Food (MAF);
- b. State-owned pasture lands for general use (communal pastures) amounting to 54%, administered by the corresponding municipality and commune; and

- c. Privately-owned lands amounting to 8% of the whole area, including group ownership. This Law goes further than the forest law by decentralizing user rights to local government institutions and allowing participation of the affected population. Communes are fully responsible for the technical and financial management of communal pastures and can also establish ten-year lease contracts with people interested in using them. DGFP's role is to approve changes in the use of communal and private pastures, provide assistance (extension services) against payment, and protect pastures and meadows from damage.

The Law on "Forestry and the Forest Police Service" (No. 7223 of October 13, 1992) defines the country's forest estate ("forest fund"), which comprises State, communal and private forests. State forest management is the responsibility of the forest administration, though the law does not specify the methods. Management of private forests is not covered under this law. Communal forests are a newly introduced category that, while still State-owned land, can be jointly managed by communes and the DGFP. Various subsidiary texts to the forestry law have also been issued, including regulations for the exploitation of forests, decisions on the setting of stumpage and other forest fees, guidelines for auctions of standing wood, instructions for protection against forest fires, the principles for the selection and establishment of protected areas, and the use of forests for recreational purposes.

The DGFP is responsible for pasture and grazing management and for collecting grazing fees, but this centralized approach was rarely accepted by local users. Recent legislation allows the transfer of user rights and management of forest land and pasture to communities. About 250 000 ha of pasture and 200 000 ha of forest in 250 of Albania's 315 communes have been identified as land that could be transferred. This does not include alpine pasture, which will remain protected land under the control of the DGFP. The IDA-Forestry Project (financed by Italy and Switzerland) includes a Communal Forest and Pasture Management component, which aims to:

- a. rehabilitate and increase the productivity of pastures near villages in order to meet firewood and fodder requirements; and
- b. assist in the transfer of land to communities, initiate participatory management of these areas with clear allocation of resources to local beneficiaries and achieve sustainable management through a system of user fees for maintenance of the resource and further investment. A total of 34 communes are now at various stages in the process. However, this is only a small proportion of the total number of communes, and substantial scope exists for including additional communes.

Pasture vegetation

The Botanical Department of Tirana University has grouped pastures on the basis of the predominant plant species (Shundi, 1987):

- a. Pasture type with *Andropogon* spp. (*distachyos*, *ischaemum* and *gryllus*). These three species grow in winter pastures above 800–1 000 m above level sea, in poor and dry lands with pH 5.5–7.0. Associated species are *Dactylis glomerata*, *Cynodon dactylon*, *Medicago minima*, different *Trifolium* spp. (*angustifolium*, *campestre*, *subterraneum*), *Bellis perennis*, *Cichorium intybus*. Grasses are 60–70%, legumes 10–20%, and plants of other botanical families 20–30%.
- b. Pasture types with *Cynodon dactylon* and *Lolium perenne*. These plants grow in moister areas and not so dry climate, on not very productive land. Associated species are: *Dactylis glomerata*, different *Trifolium* spp. (*pratense*, *subterraneum*) and *Lotus corniculatus*. In this pasture type, the feeding value is better than pasture type with *Andropogon*.
- c. Pasture type *Festuca varia*. These plants grow on calcareous slopes, dry and with low fertility. Associate species are: *Festuca* spp., *Trifolium alpinum*, different *Listera*, *Hieracium hoppeanum* etc. The proportion between grasses – legumes – other families is 8.0 : 0.5 : 1.5. Forage production is low and the forage quality is below average.
- d. Pasture type with *Nardus stricta*. These plants grow on gentle slopes with medium moisture, where pH is 4.0–5.5. The proportion between grasses – legumes – other families is 7 : 1 : 2. Associated species are: different *Agrostis*, different *Anthoxanthum*, *Genista pilosa*, *Trifolium repens* etc. It is well known that *Nardus stricta* has forage low quality.
- e. Pasture type with *Phleum alpinum*. These plants are typical of summer pastures growing in less productive lands. Associate species are: *Festuca* spp., *Agrostis*, *Trifolium pratense*, *Lotus*

corniculatus. The proportion grasses – legumes – other families is 6 : 1 : 3. Forage production is higher and of better quality than in pasture type with *Festuca* because it grows on more fertile lands.

- f. Pasture type with *Agrostis capillaris*. These plants grown in less productive lands than *Phleum alpinum*. For this reason, also forage production is less. The proportion grasses – legumes – other families is 6 : 1 : 3.

The first three types belong to the winter pastures and the last three types to the summer pastures.

Shrubs are spread over the most pasture surface, up to 800–1 000 m above sea level. Dominant shrubs include: *Arbutus unedo*, *Erica arborea*, *Myrtus communis*, *Quercus coccifera*, *Paliurus spina-christi*, different *Crataegus*. Subshrubs that only grow 0.2–0.5 m like different *Artemisia* and *Astragalus angustifolius* are spread in the summer pastures.

Stocking rate

The number of livestock grazing a unit area of land per year, in sheep equivalents per hectare is calculated for the various types of grazing lands by assuming that they are grazed by one or more kinds of animals (see Table 6). This assumption had to be made since there are no data on how the grazing resources are allocated among the different species. By comparing the data of this table (Table 6) with those of Table 2 (and recalculating – see Table 7) it becomes clear that the stocking rate of pastures is higher than the carrying capacity by about 20% if only sheep are considered (4.35 vs. 3.66), by 87% if sheep and goats are considered (6.84 vs. 3.66) and by 310 % if sheep, goats and cattle are considered. These results (Tables 6 and 7) suggest that the pastures of Albania are currently grazed by more than twice as many sheep and goats than the carrying capacity estimated with production data collected in 1981.

Grazing pressure, however, is not the same everywhere. It is highest on the winter pastures and in lowlands near villages and much lower in mountain areas, particularly summer pastures, where undergrazing seems to have become a problem locally owing to the emigration of people to urban centres and abroad. As far as wooded lands are concerned, the pressure is highest in shrublands, where goats mainly graze and least in high forests, while in coppice forests it is intermediate.

Forage availability over the seasons. Grazing animals have a more or less constant feed demand over the calendar year with the exception of the period of pregnancy when demand is slightly increased. For dairy animals, an increased quality and quantity of feed is also required during lactation. On the contrary, the feed supply of pastures is not constant over the year due to climatic factors. On the lowlands (up

Table 6. Area, structure and carrying capacity of pastures

Pastures	Area (ha)			Carrying capacity (sheep equivalents)					
	Total	Summer	Winter	Total		Summer		Winter	
				Head	Head per ha	Head	Head per ha	Head	Head per ha
State	144 077	110 942	33 135	640 959	4.45	484 776	4.37	156 183	4.71
Communal	241 552	164 152	77 371	527 674	2.18	527 681	3.21	249 983	3.23
Private	30 312	16 372	13 940	103 034	3.40	59 364	3.62	43 670	3.13
Total	415 911	291 466	124 466	1 521 667	3.66	1 071 821	3.68	449 846	3.61

Source: DGFP (2003).

Table 7. Stocking rate (sheep equivalents/ha/year) of the various land uses by different kinds of grazing animals (data from Tables 1 and 3)

Land use type	Only sheep	Only goats ¹	Sheep and goats	Only cattle ²	All animals
Total	0.67	0.38	1.06	1.27	2.32
Pastures	4.35	2.48	6.84	8.18	15.01
Forests	1.89	1.08	2.97	3.54	6.51
Only shrublands	-	5.00	-	-	-
Pastures and forests	1.32	0.75	2.07	2.47	4.54

¹ Goats were taken as equivalent to sheep (i.e. 1 sheep=1 goat).

² Cattle were considered equivalent to 5 sheep (i.e. 1 cow=5 sheep).

to 800 m), with a typical Mediterranean climate, plant growth is confined to the favourable period in terms of moisture and temperature, namely in autumn after the first rains and in spring, while in winter plant growth is reduced due to the low temperatures. On the winter pastures forage is available during autumn and spring. The same is true in arable lands used for grazing or hay. In the highlands (above 800 m altitude), the growing period moves towards the summer months due to the cold winters but the availability of forage throughout the summer depends very much on the occurrence of rain. A different case are the forests including shrublands, where the main forage supply is based on woody plants. Evergreen shrublands can provide browse to animals year-round but deciduous shrublands and forests only do so during summer.

Integrated management of wooded lands

As in other Mediterranean countries, grazing of forests in Albania is the most important non-timber use, if not the only economically viable one. The practice is traditional suggesting that most of these forests have been evolved with the presence of domestic animals. Both the flora and fauna have been adapted to grazing. Therefore, excluding livestock from these forests may have negative effects on biodiversity and ecodiversity thus creating more problems than leaving them inside. In addition, it may increase the fire risk. In technologically advanced Mediterranean countries, where livestock were removed from forests several years ago, disastrous wildfires have become a big threat to the forests and other ecosystems during the summer period. Grazing in wooded lands has both positive and negative effects. Domestic animals are herbivores, which constitute fundamental components of natural ecosystems and indispensable instruments for their functioning (energy and nutrient cycling). Whether they are beneficial or damaging largely depends on management and especially on grazing intensity. The issue, therefore, is not to exclude livestock from forests but to harmonize forest and livestock activities by integrating wooded lands in livestock production so that sustainable management of the forest resources is achieved (Papanastasis, 1984; 2003). On the other hand, relieving the forests from grazing pressure cannot be accomplished if pastures and arable lands are not properly developed as a substitute to wooded lands for forage production.

High forests. In general, the primary objective in management of high forests is timber production. Forage production can only be a secondary use. However, grazing is not compatible with all high forests. Even-aged dense forests of shade tolerant species, for example, produce no understorey vegetation under proper management during their whole life, therefore they are not suitable for grazing. If animals are allowed to get into such forests they will destroy them. Even under improper management such forests produce very little understorey vegetation that is worth grazing; they will lose more energy finding and collecting than they gain from eating such vegetation. Typical cases of this category are the beech and deciduous oak forests. Uneven-aged high forests (e.g. fir) are also unsuitable for grazing because they consist of all the age classes including seedlings, which are very vulnerable to livestock damage. High forests with the above characteristics not compatible with livestock grazing are the broadleaved and evergreen forests and woodlands dominated by *Fagus sylvatica* or *Abies borisii-regis*, or the creek and riverine deciduous forest, the classes 3, 4, 8, 10, 13, 16 and 17 of the new land cover/use map of the ANFI project. These forest types should be fully protected from grazing. They amount to 350 762 ha or 23% of the total forest lands. They belong to forests (271 469 ha) and woodlands (79 293 ha). [Note: these data are from the new survey (see ANFI, 2001) and data may differ from those in Table 3. The same applies to data presented below.]

On the contrary, even-aged open forests consisting of light-loving species produce enough understorey vegetation, which can be used by livestock. Grazing, however, should be excluded during the early stages as well as during the regeneration period because seedlings will be chewed and damaged as well. Typical cases of this category are the pine forests (e.g. black pine). In these forests, grazing can be used as a management tool to remove understorey vegetation during the cultivation period thus reducing the competition for water and nutrients and preparing the seedbed for regeneration. In all these cases, grazing should be proper, namely the stocking rate should be equal to the grazing capacity. High forests belonging to this category in Albania are the classes 7 and 15. They amount to 62 127 ha or 4% of the total forest lands.

A special case is the so-called “Mediterranean forest” consisting of warm coniferous species such as *Pinus halepensis*, *P. pinea* and *P. pinaster*. All these forests are quite open, because the dominant forest species are light-loving, thus favouring the growth of a lush woody understorey. Grazing in these forests is necessary in order to control the understorey and save them from wildfires. Mediterranean forests are the most flammable. In Albania, such forests belong to the classes 6, 9 and 14. They amount to 7 472 ha.

Coppice forests. The primary objective in management of coppice forests is firewood production. Under certain conditions forage could be a secondary objective. Coppice forests can be grazed only when sprouts grow beyond the reach of animals, especially goats. The existing rule-of-thumb applied by the Forest Service, when the young sprouts achieve a height of about 3 m or a diameter breast height (DBH) of 3–5 cm, is a sensible one. In these forests, grazing should be used to reduce the number of sprouts per stump and unit area thus favouring some of them to grow tall and fast. Such management can speed up the process of converting coppice to high forests. A typical case of this category is the oak forest. The stocking rate again should be equal to grazing capacity. Under the ANFI project, forests that fall into this category belong to classes 1, 2, 5, 11 and 12. They amount to 627 271 ha or 62% of all forests.

Lopped trees. Lopping of forest trees, especially deciduous oaks, is a traditional practice in Albania, still widespread all over the country. Although the lopped branches provide both foliage to the animals and firewood to the people, the quality of the feed is not very high and the human resources involved are considerable. In addition, lopping prevents trees from providing acorns for regeneration in both high and coppice forests. In the long run, the foliage produced by lopping should be replaced by other kinds of feed of higher quality produced on arable land (e.g. lucerne) or by higher quality foliage of trees established artificially as fodder shrub plantations with *Robinia pseudoacacia*, *Morus alba* and *Medicago arborea*.

Shrublands. The primary objective in management of shrublands should be forage production with firewood production a secondary one. These areas are the primary grazing lands for goats and they receive a very high pressure in most districts of the country. A number of reports prepared by experts from various international organizations involved in forestry development of Albania have already stressed the need to allocate shrublands to livestock in a sylvopastoral management context. Shrublands are either dominated by evergreen species such as *Arbutus unedo*, *Erica* sp., *Quercus coccifera*, *Phillyrea latifolia*, etc. or by deciduous species such as *Carpinus orientalis*, *Cornus mas*, *Fraxinus ornus*, etc. or both. The co-existence of evergreen and deciduous shrub species is quite widespread in the coastal and central parts of Albania. Under the ANFI project, the forests falling into this category are classes 19, 20, 21, 22 and 23. They amount to 150 705 ha or 14% of the forest area. Under proper grazing management, animals including goats cannot fully control the growth of shrubs. For this reason, livestock production in these areas should be combined with firewood production.

Sylvopastoral systems

Open forests (high or coppice) with less than 0.4 crown density produce more forage than timber, so the primary objective in their management could be forage production with timber a secondary objective. Such forests should be managed as sylvopastoral systems, combining forage and wood production.

Plantations. There are several areas in Albania that were planted in the recent past with fast growing species, especially pines. These plantations are usually dense, allowing limited amounts of grazeable understorey vegetation. Nevertheless, they can be grazed to control this understorey and save them from wildfires since the majority of them consist of pines, which are very flammable. In new plantations, grazing should be deferred until the saplings reach a height beyond the reach of grazing animals (e.g. goats), which could be at least two metres.

Grazing capacity of forests. Grazing capacity is the maximum number of animals that can graze a pasture without impairing its productivity. That implies that grazing management of pasture should be sustainable, i.e. it should have the capacity to carry the same number of animals in the future as currently or even more. In order to achieve such an objective, part of the annual production should be left ungrazed to sustain

productivity. This could be 40–60% of the annual forage production depending on pasture condition and the type of vegetation of the particular grazing land. For calculation of the grazing capacity (see Table 7), only the grazeable portion of forage production should be considered, namely the average dry matter production per unit area at the end of the growing season multiplied by the so called “proper use factor”.

In the estimations of grazing capacity, if the total annual forage production is considered allowable, this will result in excessive grazing of pastures and forest lands and in their eventual deterioration. In Table 8 only the grazeable portion is considered (i.e. the “proper use factor” was utilized) and the total grazing capacity for forests including woodlands and shrublands and excluding the high forests that are not to be grazed (350 762 ha) is estimated to total 10 656 813 SEUM (sheep equivalent units per month – see Table 7). If we assume that all this area is suitable for seven-month grazing per year, then the total number of SEUM that it can carry amounts to 1 522 402 sheep and goats. The majority of these animals, namely 1 153 776 or 75% of the total, can be carried in shrublands, 176 300 or 12% of the total in forests, and the remaining 192 326 animals or 13% of the total in woodlands. In other words, the grazing capacity of shrublands is three times higher than the one of high and coppice forests. More specifically, the grazing capacity of shrublands is estimated to be 2.6 SEU/ha/year, of forests to be 0.4 SEU/ha/year and of woodlands to be 0.7 SEU/ha/year, or of the whole forest domain to be about 1.3 SEU/ha/year. The grand total for all land categories is 18 414 045 SEUM.

Other pasture information

Pasture area per capita. For smaller districts the pasture area could vary to some extent, due to the limitations of the area calculations. The pasture area per capita varies widely among the districts from 0.009 ha/capita to 0.83.

Pasture area per animal. The total numbers of livestock are taken from national statistics; the accuracy of this information cannot be assessed. This should be considered in interpreting the results. The pasture areas are from the land cover/use assessment, the pasture area the quotient of these two figures. It is noted that the pasture area per head varies considerably, which could point to an overutilization of the pasture resources in some districts.

Pasture area by management type. Most of the pastures are about 60% summer pastures and 40% winter pastures. The vast majority of the pastures are natural pastures; about 1% of pastures are identified as cultivated.

Pasture area by phytoclimatic zone. The location of pasture areas is an important indicator of the carrying capacity. The pastures are almost evenly in the Lauretum (27% of the total), Castanetum (27%) and Fagetum (27%), they are much less frequent in the higher elevations, in the Picetum (3%) and Alpinetum (16%).

Pasture area by mother rock categories. Information on the mother rock of the pasture areas is important in assessing the carrying capacity. The majority of pastures have limestone as mother rock (this relates in part to the fact that they are mostly at lower elevations) with 60%, another 20% is Ultrabasic and only 15 % Flysch.

Pasture area by soil categories. The main soil category is grey-brown with 36% and brown with 20%. Pasture area by soil depth categories. The soil depth information shows that a high percentage (almost 40%) has rather shallow soils; about 1/3 medium and only 15% were classified as deep.

Pasture area by slope categories. Many of the pastures are on steep or very steep slopes (almost 80%), and only about 20% on rolling terrain, posing some limitation on the management of the pasture resources. Pasture area by erosion level – the majority of the pastures (about 60%) show erosion signs, possibly indicating overutilization.

Pasture area by harvesting mode. The vast majority of the pastures are grazed by animals; in less than 2% cutting hay was specified.

Table 8. Estimated forage production and grazing capacity in forests, pastures and arable lands¹

Category	Structural domain	Land cover	Description	Area	Estimated forage production (kg DM/ha)		Grazing capacity SEUM) 2
					Total	Grazeable	
SEMI-NATURAL VEGETATION	Forests	Broadleaved	(1) Broadleaved evergreen forest	22 027	250	125	45 890
			(2) Broadleaved deciduous forest, usually coppice, <i>Quercus</i> spp. <i>Quercus</i> spp. dominant	260 806	350	175	760 684
			(3) Creek and riverine deciduous forest	3 049	-	-	-
			(4) Broadleaved deciduous forest, <i>Fagus sylvatica</i> dominant	158 965	-	-	-
			(5) Broadleaved deciduous forest usually coppice, <i>Quercus</i> spp., <i>Ostrya</i> spp. dominant/cultivated areas	118 883	350	175	346 742
			Subtotal	563 730			1 153 316
			(6) Coniferous forest (Med.) on level land	3 677	450	225	13, 789
			(7) Coniferous forest (Sub-Med.) on slopes	22 772	350	175	66 418
			(8) Coniferous forest (Alpine) on steep land	57 946	-	-	-
			(9) Coniferous forest (Med.) on level land (beaches)	115	600	300	575
Subtotal	84 510			80 782			
		Mixed	(10) <i>Fagus sylvatica</i> pure and mixed with conifers (23%)	51 509	-	-	-
			TOTAL A	699 749			1 234 098
	Woodlands	Broadleaved	(11) Broadleaved evergreen woodland	3 360	500	250	14 000
			(12) Broadleaved deciduous open forest (coppice) <i>Quercus</i> spp. dominant	222 195	600	300	1 110 975
			(13) Broadleaved deciduous open forest with <i>Fagus sylvatica</i> dominating	44,787	-	-	-
			Subtotal	270 42			1 124 975
		Coniferous	(14) Coniferous open forest (Med.) on level land	3 680	800	400	24 533
			(15) Coniferous open forest (Sub-Med.) on slopes	39 355	600	300	196 775
			(16) Coniferous open forest (Alpine) on steep land	18 709	-	-	-
			Subtotal	61 744			221,308
	Thickets & Shrublands	Mixed	(17) <i>Fagus sylvatica</i> pure and mixed with coniferous forest	15,797	-	-	-
			TOTAL B	347 883			1 346 283
			(18) Mediterranean macchia	219 932	3 600	1 200	4, 398 640
			(19) Mediterranean macchia/ Broadleaved deciduous forest (coppice), <i>Quercus</i> spp. and <i>Quercus</i> spp.	21 602	3 600	1 200	432 040
			(20) Maquis and garrigue (deciduous shrublands)	138 846	3 600	1 200	2 776 920
			(21) Maquis and garrigue/cultivated areas	70 325	12 00	400	468 833
			TOTAL C	450 705			8,076 433
			TOTAL (A+B+C)	1 498 337			10 656 813

Category	Structural domain	Land cover	Description	Area	Estimated forage production (kg DM/ha)		Grazing capacity (SEUM) 2
					Total	Grazeable	
	Grasslands & Pastures		(22) Sparse trees and shrubs with open grass cover and rock	236 638			
			(23) Sparse trees and shrubs with very open grass cover and rocks	243 925			
			TOTAL D	480 563	600	360	2 883 378
CULTIVATED AREAS	Tree crops		(24) Arboriculture with Populus and Juglans	161			
			(25) Arboriculture with Pinus species	2 858			
			(26) Arboriculture with fruit trees or shrub crops	53 578			
			Subtotal	56 597			
	Herbaceous crops		(27) Herbaceous crops on level land	329 632			
			(28) Herbaceous crops on sloping land	205,830			
			Subtotal	535 462			
	Managed lands		Vegetated urban areas	156			
			TOTAL E	592,215	400	400	3 948 100
DICHOTOMOUS PHASE	Aquatic vegetation						
			TOTAL F	9 770			
OTHER LAND	Refused land (estimated)			154 289	600	360	925 754
	Artificial, bare & water lands			100 860	-	-	-
			TOTAL G	257 149			925 754
			GRAND TOTAL (A-G)	2 838 034			18 414 045

1 Based on the new land cover/use map produced by the ANFI project (ANFI, 2001)

2 Sheep Equivalent Units per Month (SEUM)

Pasture area by stone cover categories. Stone cover of pasture areas has a definite influence on the use by animals. Almost 40% of the pastures are classified as having medium or high stone cover.

Pasture area by altitude categories. About 50% of the pastures are at an altitude of less than 1 000 m; 50% are above 1 000m.

Pasture area by grazing use categories. The grazing intensity has a definite influence on the sustainability of grazing, depending on carrying capacity and pasture conditions. More than 73% of the pastures are grazed moderately or heavily; 23% of all pastures are classified as being grazed heavily.

Pasture area by burning status categories. Fires can be a major problem in the management of pastures. The field survey showed that 24% of the pastures showed signs of burning, a third of the burnt areas had been recently affected by fires.

Pasture area by distance from villages. Access to the next village is an important indicator of pressure on the land and for management; only 16% of pastures are closer than 1 km to the next village, and more than 40% are further than 3 km.

Pasture area by accessibility level categories. Accessibility is a prerequisite for pasture management. The distance from village shows that a large percentage (73%) of pastures are more than 1 km and more than 30% are over 3 km.

Pasture area by water supply level categories. Only 25% have a water source closer than 1 km and for almost 30% the closest water supply is more than 3 km away.

Pasture evaluation. The results of the pasture survey (ANFI, 2001) clearly show that most pastures are on limestone (60%) with steep to very steep slopes (78%) south facing (43%), and on shallow soils (51%) having low organic matter content (57%) and a relatively high level of stone coverage (40%). All these features indicate a below medium productivity since the shallow soil on south facing slopes cannot sustain a high production taking into account that a significant part of the soil surface is covered by stones. On the other hand, limestone produces soils with high fertility, with relatively high pH, which favours legumes, valuable species for the grazing animals. This fact together with the high rainfall mainly in the medium and high altitudinal zones partly counteracts their poor physical conditions and make them capable of supporting a relatively high grazing load. Nevertheless, productivity data suggest that only 20% of the total pasture area has above medium productivity. These pastures are apparently the ones found in depressions and dolines where the soil depth and slope are favourable for a high pasture growth.

On the other hand, the pasture survey data indicate that the majority of pastures are in fair to poor condition. About half of them are inappropriately grazed (too lightly or too heavily), 24% of them are subjected to fire and more than 60% of them show signs of erosion – sheet as well as accelerated. These results are amply documented by the stocking rates for the 36 districts of the country which are on average six times more than the grazing capacity estimated at no more than one sheep or goat per hectare and per year. This grazing load is not evenly distributed among the 36 districts, some of them being overexploited while others are grazed almost properly.

Finally, the pasture survey shows that very few pastures are now used for haymaking, that there is an imbalance between summer and winter pastures with the latter being less than the former and that most of the pastures are far from the settlements with poor accessibility and a lack of infrastructure, especially watering points. It should also be noted that although the pastures are dominated by herbaceous vegetation, they also have a substantial amount of woody species (25% on average). This means that they can provide feed to both sheep and goats.

6. OPPORTUNITIES FOR IMPROVEMENT OF FODDER RESOURCES

Development of pastures and meadows

Reduction or complete removal of grazing pressure from forests, especially productive (high) ones, can be done by the Forest Service by enforcing the forest law with police measures. Such measures, however, are unlikely to be effective but would create great social unrest among people living in or near the forests. The only effective policy is likely to be the development of alternative forage resources so that livestock are attracted to them and thus relieve the pressure on forests. Such alternative resources are the pastures and meadows, which are, like forests, under the responsibility and jurisdiction of the Forest Service.

For pastures and meadows to become capable of accommodating the feed needs of livestock as much as possible, they need to be properly developed, improved and managed. Such a development should be a priority issue for the Forest Service if it really wants both to save the forests and help the mountain economy. Emphasis should be placed on the following measures (World Bank and FAO, 2002):

- a. Improve grazing management, and the availability and quality of feed and fodder, which affect animal production, growth rates, and fertility and reproductive performance. Measures should be taken to improve forage production and preservation technology, management and feeding practices, and availability of clean seed for alfalfa and other forage crops planted on arable land. This should be an extension activity supported by rural communities that would jointly carry out fodder related improvement activities. The Pasture Management Programme could also be expanded to include additional communes. Limit the unsustainable use of grazing by allowing the resource to be controlled locally.
- b. Provide adequate and cost-effective services including animal health and breeding to both subsistence farmers and developing commercial producers and improve livestock health by addressing the relatively high incidence of diseases that pose public health hazards. Veterinary services should continue to be demand-driven and largely provided by private providers, but with a public sector role in controlling epidemic and zoonotic diseases.
- c. Further develop agro-processing that will increase the range of marketing outlets for farm products as well as the possibilities for product transformation and adding value.
- d. Further investment in food safety is warranted, but needs to be designed carefully and should not deprive the rural and urban poor of access to animal products. Develop an affordable livestock product safety control system that does not price essential food out of the reach of the poor.

Pasture survey

Before any development, pastures and meadows should be surveyed and an inventory prepared. This means that they should be mapped and evaluated for their productivity and grazing capacity. Nowadays, although these resources are considered separate from forests, their location and boundaries are known only by local people through tradition. The last assessment of their productivity was in 1981. It is evident that no proper management of these resources can be accomplished without a comprehensive evaluation of their current productive potential and their capacity for livestock production. Their survey, mapping and productivity assessment should be done by using, as much as possible, modern technology (remote sensing and GIS) so that the field work, which is very expensive and time consuming, is kept to a minimum.

Infrastructure

No pasture development can be realized without the necessary infrastructure, which includes access roads, watering points, animal shelters and huts for shepherds. Access roads are needed to move animals to the pastures on foot or by trucks, but chiefly for the transport of livestock products (e.g. milk) and shepherds. Watering points include spring development, transport of water, water basins and troughs. Such points are especially necessary in limestone areas where natural streams are rare and rainwater has to be collected. Animal shelters are needed in the summer pastures where weather conditions are extreme, severely affecting the productivity of the animals. In the winter pastures, shepherds normally have sheds to house their animals at night and in bad weather. Finally, huts are also needed in the summer pastures so that shepherds can stay and rest as well as protect themselves from bad weather. In the winter

pastures, they are not necessary because these pastures are near villages where shepherds normally reside. Although a considerable amount of technical work is already available, much more is needed for: (a) the pastures to be properly developed and utilized, and (b) the young people to stay and work in livestock husbandry in the mountains and their quality of life to be improved compared to the lowlands and the cities. The problem is that such work is expensive. Nevertheless, it can be justified if it is included in the general development plans of the rural areas and especially the mountainous ones so that they serve other needs as well, such as communication between villages by vehicle (for the roads), control of wildfires (with the water of the watering points), etc. One way to reduce the cost of the technical work in pastures is to pre-fabricate and produce some of the inputs (e.g. water troughs, huts) in large numbers so that they are easily transported and set up in the places needed.

Grazing capacity. The current grazing capacity of pastures and meadows is quite low. By most local (Albanian) accounts (e.g. IFMP, 1994) and ANFI, 2001 estimates, the dry matter production is no more than 600 kg/ha on average, which amounts to 2 883 378 SEUM after taking into account a “proper use factor” of 60%. For a seven-month period per year, the SEU (sheep equivalent units) that can graze in these areas are about 412 000, which is about 0.9 SEU/ha/year, namely less than one-third of the official estimate of DGFP based on data collected in 1981. This discrepancy is probably attributable to the fact that the official estimates of DGFP do not take into account the “proper use factor” and also they are quite old. Several Albanian foresters contend that the productivity of pastures and meadows has been significantly reduced over the last 20 years. It is necessary, therefore, to conduct a survey of the current production of pastures and meadows so that DGFP has more reliable data to determine the grazing capacity of pastures and meadows.

Vegetation improvements

Despite their low forage production, the productive potential of pastures and meadows is quite high. This is exemplified by the great species richness that most of them have, the presence of several palatable species (e.g. legumes) and the favourable soil and climatic conditions. For this potential to be exploited a number of vegetation improvements are needed. They include the following:

- a. **Weed control.** Pastures are full of weeds due to the mismanagement applied so far and still being applied. These weeds are both herbaceous and woody. Examples of herbaceous weeds are *Asphodelus* spp., and *Urginea maritima* in the winter pastures and *Helleborus cyclophyllus* in the summer pastures as well as several thistles in both of them (e.g. *Cirsium*, *Carduus* etc). Examples of woody weeds are *Phlomis fruticosa*, *Paliurus spina-christi* and *Rubus* spp. in the winter pastures and *Juniperus nana* and *Astragalus* spp. in the summer pastures. All these weeds need to be controlled in order to increase productivity. Control can be manual or with machines. Also, in some cases, fire can be used. Burning to control weeds is used by shepherds but this is not regulated and often causes more damage than good. With weed control, pasture production may be doubled.
- b. **Fertilizers.** Fertilization is an easy and relatively inexpensive method to increase forage production and improve its quality. It can result in doubling of the current production and greatly improve milk and meat production. Currently, there is no such practice in Albania but it could be considered in the future as a very effective method, particularly in the private pastures where grazing management can be also controlled.
- c. **Reseeding.** Reseeding pastures with palatable species is potentially a very good method to increase forage production up to three times compared with the current level. It requires, however, good soil preparation, and the use of the most appropriate species adapted to each environment. Its problems are the high cost and the need to defer grazing until the sown species are established. It can be used only on pastures on level land and gentle slopes with good soil depth (more than 30 cm).
- d. **Shrub planting.** Introduction of palatable shrubs to pastures can serve two objectives: a) to provide forage during the critical period of the year, when herbaceous species grow very little such as when conditions are cold (winter) or dry (summer); and b) to control soil erosion. Since both objectives are important, fodder shrub plantations should become a basic activity of the Forest Service to upgrade pastures. Suitable species for plantations are: *Robinia pseudoacacia* (already used), *Medicago arborea* and *Morus alba* (the shrub variety Kokuso 21). All are fast growing and

very palatable. They can be used either for direct grazing or for cutting-and-carrying so that they are used as supplementary feed. If such plantations are properly developed, they can also provide feed for the winter after cutting and drying and thus substituting the current practice of forest tree lopping that Albanian farmers use all over the country. The feed value of these shrubs is much higher than oak or beech leaves and farmers can be easily convinced to use fodder shrubs instead of forest species. The only problem is the high cost of establishment of fodder shrub plantations. To reduce this cost, seedlings of shrubs can be given free of charge to farmers in order for them to establish them on their own land (pasture or agricultural land).

All the above vegetation improvements, combined or applied alone, can result in at least a doubling of the current production and, consequently, the grazing capacity of pastures.

Management plans. The most inexpensive and effective method of improving pasture productivity is proper grazing management. Such management involves: a) employment of a stocking rate equal to grazing capacity, namely grazing the pastures with the proper number of animals, b) use of kinds of animals suitable to pastures ; c) grazing at the proper period (season) of the year; and d) grazing for as long as available forage exists (duration of grazing). The latter two conditions refer to the grazing system that should be applied to a particular pasture.

Development of agricultural areas

Even if pastures and meadows are properly developed and used, the pressure of livestock on high forests will not be completely relieved. This is because pastures and meadows as well as shrublands are insufficient to cover animal needs in feed for the whole year round. They require an additional source of feed for the critical periods of the year. The source of this feed is the agricultural lands.

In Albania, agricultural lands are vital for the welfare of animals; these include arable land and abandoned agricultural areas. The former are grazed by livestock, especially cows, after harvest or between two successive crops while the latter are grazed almost the whole year round. The grazing capacity of all these lands is estimated to be 3 948 100 SEUM after considering their average forage production to be 400 kg DM/ha/year. This production is totally available to the animals, because agricultural lands are not managed on a sustained yield basis as are forests and pastures. As a result, the "proper use factor" is not needed. By accepting an average grazing period of three months per year on agricultural lands, the number of SEU that could be maintained in these areas is about 1 316 000.

In addition to being grazed, agricultural lands are also used for the production of hay (e.g. lucerne) and residues (maize, etc.). This hay is also essential to animals, particularly cows, for the winter period. Finally, agricultural lands are also used for the production of grain (maize, barley, etc.) that is a very important supplementary feed for livestock during winter.

Opportunities for improvement of pastures (*Papanastasis, 2003*):

- a. Grazing should be considered as the most important non-timber use of forests and treated as a tool for their conservation and sustainable management. This philosophy should be incorporated in the forest law by revising it so that grazing by domestic and wild animals becomes an integral component of management.
- b. Of the 1 026 410 ha (see Table 4) of forests, woodlands, thickets and shrublands, recorded as semi-natural vegetation, 373 142 ha (Table 3) of high forests consisting of coniferous and broadleaved species, or 23% of the whole forest area, should be totally protected from livestock grazing. The remaining 77% of forests woodlands and shrublands should be allowed to be properly grazed.
- c. Shrublands amounting to 221 217 ha (Table 4), should be primarily managed for forage production but without damaging their capacity to also produce firewood as a secondary product.
- d. Lopping oaks or other tree species to collect foliage for animals in winter should be gradually stopped and replaced by other sources of similar or better feed. Such sources could be artificial fodder shrub plantations on private, communal or public lands or hay fields in abandoned agricultural areas.
- e. Pastures and meadows should be surveyed, improved and rationally managed to: (a) protect them from degradation, (b) restore their productivity and (c) relieve the grazing pressure from forests.

This development should be done in the framework of new and integrated management plans. Similar actions should also be taken for the “refused” lands.

- f. Agricultural areas, and especially the underutilized or abandoned ones, should be actively incorporated in livestock production by developing improved (artificial) pastures and enhancing the cultivation of forage and grain crops so that high-quality feed is produced to be used by animals in the critical periods of the year.
- g. The current excessive number of livestock can be reduced if a rigorous breeding programme is applied to replace a significant part of them with fewer but more productive breeds. This can be done for sheep and goats but especially for cattle.
- h. Intensive short courses and seminars on pasture and range management should be organized with the assistance of international organizations for training of foresters already employed by DGFP while the subject of range management should be included in the curriculum of the Faculty of Forest Sciences at the Agricultural University of Tirana. In addition, pasture and range research should be initiated in the Forestry and Pastures Institute of Tirana.

7. RESEARCH AND DEVELOPMENT ORGANIZATIONS AND PERSONNEL

The Directorate General of Forests and Pastures (DGFP) is responsible for pasture management and their cadastral register. E-mail address: DPPK@albaniaonline.net and the pasture officer: scenko@dppk.netscenko@dppk.net

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9. CONTACTS

This profile was prepared by Prof. Andrea Shundi who was the main lecturer for grasslands and forage plants at the Agricultural University of Tirana from 1980 to 1992. He also participated, with papers on rangelands in various international congresses (Montpellier, France 1987, Palmerston North, New Zealand 1993, Salt Lake City, USA 1995, Townsville, Australia 1999) and meetings of the FAO European Grassland Network (Montpellier, France 1986, Bari, Italy 1990, Chania, Greece 1993). He has been resident in USA since 1999.

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