Country Pasture/Forage Resource Profiles

LITHUANIA

by

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CONTENTS

1. INTRODUCTION

With a population of 3.5 million (the July 2006 population was estimated at 3 585 906 by World Factbook, with a growth rate of –0.3%), Lithuania occupies the western fringe of the East European Plain, covering an area of 6.5 million ha It lies between longitudes 21°and 27° E and latitudes 54° and 57° N, and borders Latvia in the north, Belarus in the southeast and Poland and Kaliningrad Region in the southwest (see Figure 1). Although a predominantly flat country with over 3 000 lakes and numerous rivers (the biggest of which is the Nemunas), it has two broad bands of territory that exceed 150 m above sea level.

Figure 1. Map of Lithuania

Of the 6.5 million ha of land, the utilized agricultural area (UAA) is 3.5 million ha (i.e. 54% of the total); arable land accounts for 2.95 million ha (84.1% of UAA) followed by meadows and natural pastures (0.496 m ha, or 14.2% of UAA). A high proportion of the arable land is in forage cropping, including temporary grassland (44.4% of crop area); approximately 1.8 million ha are covered with forest while more than 1 million ha of hilly and other land are not used for agriculture. About 50% of the UAA land is planted with cereals. Some land within the UAA is now abandoned and this has been estimated at 0.36 m ha or 10% of UAA (EU DG VI Report, 1998 and Rural Development Plan ,RDP, 1999).

In the Soviet period most agricultural produce came from collective and state farms. In total there were about 3 000 collective farms, typically with around 1 000 ha, and 400 state farms with an average size of 4 500 ha Both groups together covered about 3.1–3.2 million ha which amounted to about 90% of all agricultural land; household farmers used the rest.

Main crops such as cereals and sugar beet were grown on the large-scale farms, but the share of the small farms in livestock production was higher. Between 1970 and 1990 the household farms produced about 40% of the total amount of milk. At the beginning of this period their share in meat production also amounted to nearly 40%, but this figure declined to about 20% by 1990. Total meat production increased in this period from 390 000 tonnes to about 530 000 tonnes (carcass weight), whereas meat production on household farms declined; total milk production increased from 2.5 million tonnes to 3.2 million tonnes. The number of dairy cows was relatively constant, varying between 840 000 and 875 000 head. In the same period the annual milk production per cow increased from 2 950 to 3 800 kg.

Restitution of land to private owners began in 1989 under *perestroyka*. These new owners (known as "89'ers") gained a headstart over subsequent new private farmers because they had favourable terms for borrowing money; high inflation since has further reduced the original cost of their loans.

Lithuania gained independence from The Soviet Union in 1991 and since then restitution has continued at a faster rate. Where previous family ownership can be proved the new owners are known as "restitution farmers" but most land has been returned to village families, who have no prior ownership claims, in small lots of 2 to 3 ha; these are known as "plotters". Much of this land is farmed by the new owners as household plots, but also a large proportion is retained by surviving former collective/state farms who pay rent for the land often in the form of produce rather than money. These farms have also been privatized and are now known as "bendroves" or joint stock companies and are often involved in

ventures such as food processing and other trading activities. Their number is much reduced compared to former collectives/ state farms.

The 1997 situation is shown in Table 1.

Table 1. Farm structure 1997

	Number	Average size ha	% of UAA
Family farms	196 000	11.7	42.1
Household plots	342 700	2.2	24.5
Agricultural companies	1 660	371.6	18.1
Other land users			15.3

Source: Lithuanian Rural Development Plan (RDP,1999)

The whole process of land restitution has proved difficult and complex and has been delayed by several changes to the law since 1991. Physical restitution of land is well ahead of land registration so that a land market is slow to develop due to the difficulty of proving ownership. At the same time, however, there is an active lease market.

The structure of the cow herd changed dramatically with the disbanding/privatisation of the collective farms (bendroves), when much of the production was dispersed into small farms and family plots. The production and consumption levels in the dairy sector have since stabilized. Direct domestic consumption has increased, as has the number of household cows, while sales to dairy companies have declined.

Beef production is seen mainly as a by-product of milk production with the average weight of slaughtered animals low at around 300 kg. The decline in this sector continues due to the general drop in livestock numbers.

Sheep production has always been very limited with only 15 800 head recorded in 1999. Goat numbers are also very low but have almost quadrupled since 1992 as sheep numbers have declined (FAO database). Goats have become more popular as household animals for domestic milk production.

Livestock numbers since 1995 are shown in Table 2; the dominance of cattle production and also the decline in their numbers since independence in 1991 is evident, when numbers for cattle were 2 196 600 and sheep 58 000; the numbers of goats have increased notably since the 6 300 recorded then. Data for total meat and cow milk production for the period 1996–2005 are given in Table 2 as are figures for milk equivalent imports of the same period.

Almost one-third of the land is forested and this industry contributes significantly to the economy of Lithuania with the export of wood and wood products providing 10% of total export value.

The loss of markets in the former Soviet Union, the fall in domestic consumption and the complex process of land reform have combined to cause Lithuanian agricultural production to decline by 50% during the transition period to 1998 (EU DG VI Report); the decline in production is likely to have continued to the present.

Table 2. Grazing livestock numbers and meat and milk production and milk imports, 1996–2005

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Cattle nos (,000 head)	1 065	1 054	1 016	923	898	748	752	779	812	792
Sheep nos (,000 head)	32.3	28.2	24.0	15.8	13.8	11.5	12.3	13.6	16.9	22.2
Goats nos (,000 head)	14.3	16.9	18.5	23.7	24.7	23.0	23.7	22.0	27.2	26.9
Total meat production (mt ,000)	199.0	200.9	202.3	192.9	186.4	150.5	173.6	196.5	213.9	212.5
Cow milk production (mt ,000)	1 832	1 950	1 915	1 702	1 713	1 718	1 765	1 789	1 842	1 300
Milk equivalent imports (mt ,000)	333.9	178.2	108.8	53.5	253.2	192.7	64.0	67.3	55.7	n.r.

Source: FAO database 2006
n.r. = no record

2. SOILS AND TOPOGRAPHY

2.1 Major topographical features

Although Lithuania is predominantly flat, it has two broad bands of territory, which often exceed 150 m above sea level: one is down the eastern quarter of the country, on the border with Belarus, reaching its highest levels in the Medininku Upland in the southeast where the country's highest point is located (Juozapines 294 m); the other band is the Zemaitija Upland, which spreads over much of the northwest

and reaches a height of 234 m. The River Nemunas is the biggest of Lithuania's rivers, flowing north from Belarus to the centre of the country at Kaunas, Lithuania's second city and former capital, where it is joined by the Neris flowing in from the capital, Vilnius, to the east. The Nemunas then flows westwards and forms the boundary with Kaliningrad as it nears the Baltic.

Marshes and swamps are prevalent especially in the north and east, although much of the original wetlands have been drained for agriculture. More than 3 000 shallow lakes remain, being most numerous in the northeast.

Over 80% of the country has been drained using an underground tile drainage system feeding into open field laterals. This large-scale drainage programme, covering over two million ha, was completed in 1991, but has not been well maintained. Nevertheless land that formerly was not suited to cropping because of waterlogging is now available for tillage.

The wetlands make up a large part of the Silute District to the southwest. Some of this is below sea level and has been drained with a system of dykes and pumped drainage channels. They are part of the delta or flood plains on the northern banks of the Nemunas river. This was a major engineering project during Soviet times.

Lithuanian also has large reserves of peat.

Lithuania's Baltic coast extends for about 100 km, half of which lies along the Courland Spit (Neringa), a long, narrow sandbar 98 km long and up to 66 m high, but no more than four km wide. Behind this is a large freshwater lagoon running down into Russian Kaliningrad. The Nemunas empties into this lagoon which has a narrow opening into the Baltic at its north end at Klaipeda, Lithuania's large seaport.

2.2 Major soil types

Soil types are varied. Low fertility acid soddy podzolic sandy loams as well as sands and drained podzolic gleys account for 63% of soils. Fertile soddy calcareous, predominantly loams and drained soddy gleys cover 26% of the area. The rest is occupied by boggy riverside and some other types of soils (Stuikys and Ladyga,1995)

Lithuania can be broadly divided into four regions in terms of soil types (Figure 2): the most productive soils are in the centre of the country; the western part has wetter acid soils; sandy hills and woodlands prevail in the east of the country; in northern areas there is a region of calcareous type soils and landscape where environmentally friendly farming methods are now being promoted in order to prevent contamination of ground water (McGlynn, 1996).

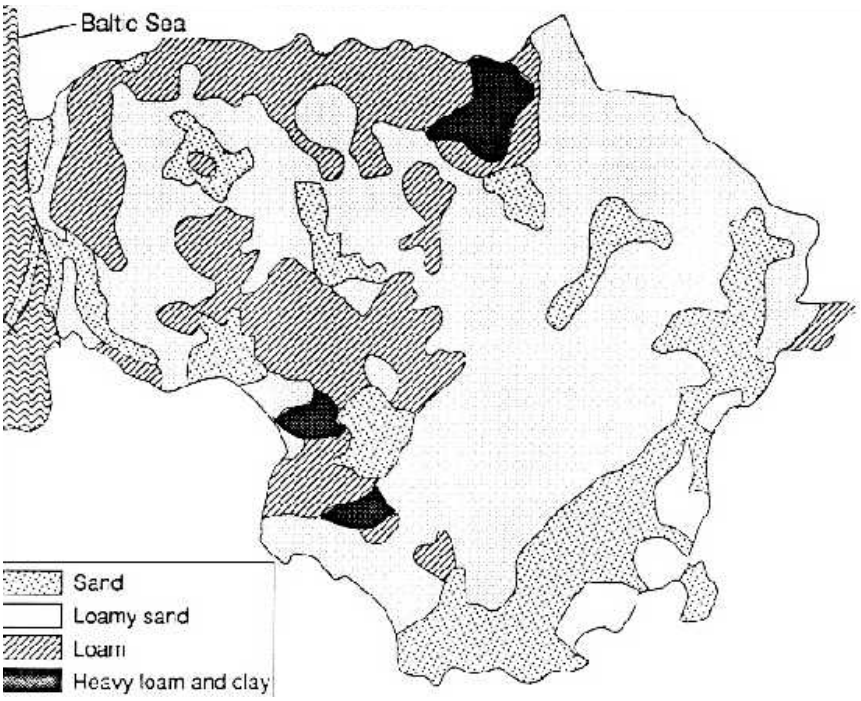

Figure 2. Soil map of Lithuania
Source: Lithuanian Grassland Management Project Inception Report

3 CLIMATE AND ECOLOGICAL ZONES

3.1 General climate – effects of topography

The climate of Lithuania is transitional between maritime and continental; in the 12–15 km-wide coastal zone it is maritime and in the eastern part of the country it is continental. It is characterized by moderate heat in summer as well as by adequate humidity and a sufficient number of sunny days. The negative features include long autumns and winters, and a relatively short growing period (169–202 days). Winters tend to be overcast and variable in temperature and snow cover is by no means continuous because cold periods can be followed by sudden thaws. The average annual temperature is approximately 6 °C with average January temperature of –4.8 °C, and average July temperature of +17.2 °C. The average annual precipitation is 626 mm; most rain falls in summer, which often hampers farming operations such as haymaking and the harvesting of crops. The weather is generally very changeable and there is a significant variation in the rainfall patterns and minimum temperatures between the east and west of the country: the eastern half experiences colder winter temperatures and the western coastal areas experience higher precipitation levels due to the maritime influence of the Baltic. Figure 3 shows the difference between Klaipeda in the west and Vilnius in the east.

3.2 Agro-ecological zones

Although Lithuania is low lying, the land is undulating to the east and west and very low lying to the southwest and extreme northwest.

Separating these areas is a wide band of well-drained level fertile soil in the central area widening to the northwest. This central plain is the main arable area and comprises nearly 50% of the agricultural land. Traditionally there have also been large dairy herds in this area, with forage crops providing the rotation with arable crops. Cereals dominate arable cropping, with spring barley the most widely grown, followed by winter wheat, rye and oats. Winter barley does not survive Lithuanian winters. Likewise oilseed rape is increasingly grown but only as a spring crop. Maize is increasingly grown but it fails to produce mature grain due to the short growing season and is used for forage only. Sugar beet is widely grown for sugar extraction and fodder beet is grown for animal feed. Buckwheat is cropped mostly in the sandy soils in the east of the country. Potatoes are widely grown and used for food (potatoes are regarded as the second 'bread'), animal feed, and seed. National dishes made from potatoes, '*cepelinai*' and '*vedarai*', have gained wide popularity.

Other notable zones are the Silute wetlands to the south west bordering the Nemunas delta. This area was drained prior to the second world war and during the Soviet period to leave fertile polders that were used to grow grass for drying, but in the absence of cheap oil supplies from Russia this practice has now been abandoned and much of the land remains unutilized.

Forest dominates the upland and sandy areas. Over a quarter of the land mass is forest, which is well dispersed throughout Lithuania on land of lower fertility or poor drainage. There are also large forest areas east of Silute, west of Kaunas and northeast of Vilnius. The largest forest, however, lies to the southwest of Vilnius, centring on Varena, and extends in a wide band down to the border with Belarus.

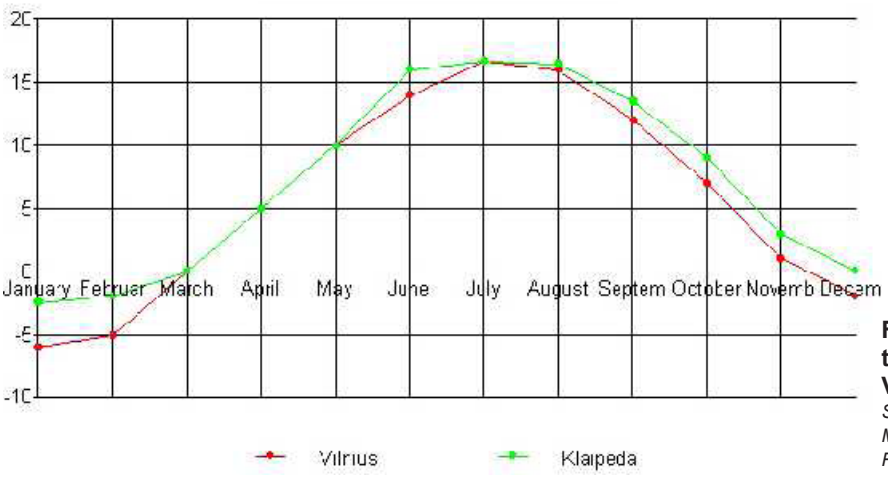

Figure 3. Annual temperature variation at Vilnius and Klaipeda
Source: Lithuanian Grassland Management Project Inception Report

4. RUMINANT LIVESTOCK PRODUCTION SYSTEMS

4.1 Cattle numbers and production

According to the national census of 1998 the cattle population was as per Table 3 (the total differs slightly from data in Table2).

The main features are:

- the dominance of the dairy sector
- the high proportion of cattle on plotters holdings (57%)
- the very low numbers of cattle for fattening
- the high proportion of fattening cattle on bendroves

Table 4 shows how meat and milk production has varied over recent years.

4.2 Dairy

There are two main cattle breeds, the Lithuanian Black-and-White (about 60% of cows), originally based on Dutch Friesians and the Lithuanian Red (about 40%). The Black-and Whites are noted for higher milk yields and the Reds for higher butter fat content. Recently there has been a trend towards crossing with Holstein / Friesians due to an increasing availability of semen from abroad. Very few bulls are kept on farms and there is an AI service available; however, the choice of semen for household cows is very limited.

Prior to transition, Lithuanian dairy herds were housed in large, tie-up stall houses which were fitted with milk pipelines and chain and conveyor muck disposal systems. Each house would normally have 200 stalls, with 50 cows per milker. Forage feeding was from a central passageway. Milk was delivered by pipeline to refrigerated bulk tanks. The system was typical of many former communist block countries. Many of these herds still exist on the majority of surviving bendroves and until 1997 very few of these farms had started to modernize housing and milking facilities.

These herds are generally fed on poor quality forage based on silage supplemented with hay, straw, wet sugar beet pulp and fodder beet plus cereals and peas/ beans as a concentrate. By western standards the ration is of low energy and is inadequately supplemented with both energy and protein. The cereals and peas are often fed only once during the day. Extra supplementation with cereals would generally be cost effective but it is difficult to persuade financially hard pressed herd managers that the extra feeding is worthwhile. Cows are generally in poor condition and this delays milk yield response to improved feeding.

Since 1997 a few bendroves have started to modernize production methods with the installation of the latest parlours and a change to lose housing with cubicles. On other farms, although the tie-up cow-sheds have been retained, milking systems have been modernized by replacing old Soviet equipment

Table 3. Number of cattle according to age and gender (thousands)

			On all farms	On bendroves and enterprises	On farmers' farms (private farms)	On small households-plotters
Cattle total			1 068.0	271.8	185.0	611.2
up to 1 year–old	Bulls & heifers for slaughter		105.5	37.3	20.9	47.3
	for breeding	Bulls	14.9	1.3	3.3	10.3
		Heifers	92.1	31.4	15.7	45.0
from 1 to 2 year-old	Bulls		70.0	35.5	11.1	23.4
	heifers	for slaughter	19.4	8.2	2.5	8.7
		for breeding	82.1	32.0	14.2	35.9
2 year-old or older	Bulls		17.3	11.2	1.9	4.2
	heifers	for slaughter	7.3	3.8	0.7	2.8
		for breeding	36.5	18.6	6.2	11.2
	cows	Dairy	615.3	86.5	108.0	420.8
		for fattening	7.6	6.0	0.5	1.1

Table 4. Production trends ('000 tonnes)

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Cows milk (fresh)	1 819	1 832	1 950	1 915	1 702	1 713	1 718	1 765	1 789	1 842	1 300
Beef and veal	87	83	90	81	77	75	47	45	52	58	57
Mutton and lamb	1.6	1.4	1.2	1.2	1.2	0.9	0.8	0.8	0.7	0.7	0.9

Source: FAO database 2006

with modern pipeline and new bulk cooling systems. In most cases the old buildings have been used as an umbrella for the refurbished interiors. Some of these farms have also purchased mixer feeder wagons to improve the speed, quality and accuracy of the feeding.

Table 5.Milk projections

	1996	1997	1998	2000	2003
Dairy cows (000's)	590	586	606	618	636
Yield kg/cow/year	3 105	3 104	3 092	3 216	3 415
Production ('000 t)	1 832	1 819	1 874	1 988	2 172
Availability for processing ('000 t)	790	822	863	907	980
Consumption (kg per population head)	213	222	233	245	265
Self sufficiency (%)	232	221	217	219	222

Source: EU DG VI Report 1998

As indicated earlier the majority of dairy cows are with plotters who typically keep two cows. These produce more milk than can be used by the households so the surplus is taken to village collection points where the milk is collected by tanker for processing. The feeding of the cows during winter is usually with hay plus fodder beet and cereal/pulses. Poor quality hay plus low levels of supplementation result in low yields.

A major problem with plotters' milk is that it is of poor hygienic quality due to a lack of proper cooling; storage of milk in wells is usually the cooling method employed. There are no cooling facilities at village collection points and milk is not treated until it arrives at the processing plants. Penalties for poorer quality milk are becoming increasingly severe so that unless plotters co-operate to acquire refrigerated cooling facilities it is likely that their milk will become progressively more difficult to sell. According to the RDP (1999) only 14% of total raw milk sold in 1998 was of grade A quality (EU standard). This is reported to have increased to 33% in 1999 (Kadzuilis – personal communication).

Tethering of cows for grazing is the norm for plotters' cows. Water is brought by bucket to the cows two or three times a day and the cows are hand milked. Water restriction almost certainly reduces yields.

There is a steadily developing private dairy herd sector with a herd size of between 5 and 30 cows. These are generally hand milked but in these herds there is a steady move to machine milking and a trend away from tethered grazing. There is also an increasing number of refrigerated milk cooling installations on these farms. This is strongly encouraged by both dairies and the government, with the provision of limited preferential loans and subsidies. There is also a move to improve forage production through reseeding of grassland and conservation as silage rather than hay.

This private or family farm sector is seen as the major growth area to replace the milk from plotter's production. Government policy is aimed at encouraging this growth with subsidies under the Rural Support Fund available for modernisation of such herds with the proviso that a business plan is prepared for growth of the herd size to 30 cows over a maximum 5-year period. As the funds are limited there is competition to access them. There have also been problems in obtaining loans from banks at reasonable interest rates.

Some projections for the dairy sector are shown in Table 5 (these were made in 2000 when the profile was drafted).

It is clear that an increase in production was anticipated in 1998 but this was before the Russian crisis. It is likely that production will now be less than these expectations (FAOSTAT data indicate that milk production has not increased as projected in Table 5 - see Table 4 - and also the number of dairy cows had fallen to 448 100 by 2004 and 433 900 by 2005). The RDP 1999 estimates that current production amounted to 208% self sufficiency, so clearly Lithuania needs to export to reduce its milk surpluses despite a high level of milk consumption per head of the population. So far it has been heavily dependent on exports to Russia, however a good proportion of Lithuania's larger dairies have EU certified export licences.

4.3 Beef

There is no history of beef production from suckler cows in Lithuania. All beef production has been as a by-product of the dairy herd. During the Soviet period most bull calves were kept for beef production. Both the Lithuanian Red and Lithuanian Black and White were regarded as dual-purpose breeds. Most beef produced on the former collective and state farms under indoor feeding systems was based predominantly on cereals, with beef exported to Russia. There has never been any tradition of producing beef from grazing.

There are very few statistics available on beef production both before and since Independence. Nevertheless it can be seen from the FAO statistics in Table 4 that there has been a dramatic drop in beef production since 1992 (226 100 metric tonnes). It is well known that beef production in 1992 had already fallen from a probable peak in 1989/90. It can be seen from Table 3 that few young animals are kept back for slaughter i.e. most are for replacements. The figures demonstrate that most beef is derived from cull cows and this is confirmed by the fact that few former indoor finishing units for bull beef are now in use.

Government policy is to try to stimulate higher levels of specialist beef production with the aim of diversifying away from dairy production, and an extensive programme of subsidies has been created to support beef producing farmers. Young animals when slaughtered are now classified according to weight and subsidies are given when they have reached the minimum liveweight of 400 kg. Beef crosses also receive a higher subsidy than dairy breeds which has led to an increased interest in cross breeding. Pure beef breed animals, when sold for breeding purposes are also well subsidized, since they can contribute significantly to improved beef quality.

There is a need to trial systems of beef production that are more reliant on forages and grassland as an alternative to indoor feedlot beef production. Experimental herds of suckler cows have also been established. So far these have been purebred herds using Hereford, Charolais and Saler breeds. Saler cattle imports are the most recent and a herd has been established at the Lithuanian Institute of Agriculture at Dotnuva. Charolais and Hereford herds have been established on the Silute wetlands where the most promising breed for the conditions there has been the Herefords (Prof D.C. Juckna, personal communication)

The EU funded Lithuanian Grassland Management Project produced a report on improving beef production in Lithuania (Schukking and hamnett 1998), following a request from the Lithuanian Government to consider the need to diversify away from the heavy dependence on the dairy sector to utilize the extensive grasslands. Using UK and Dutch physical performance data and linking these to current Lithuanian input and output prices it was possible to make the following recommendations as quoted from the report:

- since barley beef production seems to be a profitable system under the currently prevailing conditions in Lithuania, it is strongly recommended that experiments take place with this system, both in practice and on research institutes;
- the same applies to fattening on maize silage, because there is only limited experience with this system. At the same time more attention should be paid to improving the management of maize growing;
- there should be much more diversification of grazing livestock enterprises within Lithuania;
- cattle for beef finishing should be reared and finished at grass on loose grazing systems as part of this diversification process adopting systems used in other countries. This would help reduce the present under-utilisation of grassland;
- present progress towards the establishment of suckler herds should be accelerated. Replacement heifers for a suckler herd should be beef crossbreds born to the dairy herd;
- the present system of subsidising beef production should be reviewed with a view to harmonising with the EU system;
- a system of beef premium headage payments similar to the EU system should be adopted;
- suckler cows should receive headage payments to accelerate expansion of the suckler herd;
- pedigree beef suckler herds should also be encouraged, to provide a source of beef breeding stock. The bulls produced would be used as bulls for the suckler herd and for AI;
- a system of independent performance recording (weight for age recording) should be considered to provide a measure of genetic merit for pedigree beef suckler herds;
- consideration should be given to subsidizing the erection of fencing in marginal areas;
- the 'SEUROP' EU beef carcase classification scheme should be introduced as soon as possible.

4.4 Sheep and goat production

There is no tradition of sheep or goat production in Lithuania and numbers for both species are very low as shown in Table 2. Sheep are kept for meat and wool and are not milked; the local sheep breed is the Lithuanian Blackhead and there is only one sizeable flock of around 200 ewes near Seduva in central

Lithuania. A few householders keep goats for milk and it is interesting to note that they have increased since 1992 and now outnumber sheep.

The situation further emphasizes the dominance of dairying as the only significant user of pasture/forage resources and underlines its vulnerability in the absence of further diversification.

4.5 Animal health

The animal health situation concerning OIE-List A diseases appears to be extremely good. No cases have been reported since 1993, whereas a few cases of OIE-List B diseases like Rabies and Enzootic Bovine Leucosis have occurred. The main obstacle to the trade of pigs and non heat treated pig products with the EU is the continuation of regular vaccination of 60% of the Lithuanian pig populations against Classical Swine Fever. Assistance is required to elaborate disease monitoring and surveillance plans as well as contingency plans.

5. PASTURE RESOURCE

5.1 Forage crops grown

Most Lithuanian grassland has been reseeded in relatively recent times with the oldest grassland probably resown within the last 15 years. Natural grasslands exist in the upland areas in the north west and south east. Reseeding of pasture has traditionally been through undersowing with cereals or sometimes with Italian Ryegrass in the spring. The mix may also include vetches or peas. The cereal crop may be cut early for silage but may alternatively be cut for grain. The aim is to use the cereal crop to smother the early growth of weeds. Traditional seed mixtures include grasses *Phleum pratense, Festuca pratensis, Dactylus glomerata, Poa pratensis* in order of popularity. *Trifolium pratense* and *repens* are also included but *T. pratense* is much more popular than *T. repens, because* of its high early yield. *Lolium multiflorum* is sown for early yield and to compete with early weed development as descibed above. *L. perenne* is also sown but traditionally has not been popular because of winter survival problems. With new varieties there is now more interest in *L. perenne.* Seed mixtures tend to contain several species. *Dactylus glomerata ha*s been popular and is now widespread through older grasslands. It is a problem since it flowers earlier than most species (mid-May in Lithuania) and therefore is over mature when cut for hay. Natural spread is probably due to haymaking and its ability to shed mature seed before many other species.

Lucerne has also been a popular crop for silage production on bendroves and there is also interest in using it for grazing using specially developed varieties. Maize is also grown for silage production on some progressive bendroves and there is increasing interest in its use now that early maturing varieties, that can produce a good crop in most years, are available.

5.2 Problems occurring

Since independence in 1991 there has been a big drop in reseeding of pasture and a reversion to semi-natural grasslands. The situation in the Silute wetlands is typical of what is happening to much of Lithuanian grassland: previously this grassland was cut and artificially dried to produce grass meal for export to Russia; today the wetlands are divided among 12 000 farmers with small average farm size and the number of cows in the area is estimated to be less than 3 000. The grassmeal plants are no longer operational because of the high cost of fuel. Farmers do not have the machinery to harvest silage and the cost of hay machinery for hire is expensive. In an effort to reduce costs farmers have opted to sacrifice hay quality for quantity and are cutting the hay at a much later stage of growth in order to get higher yields. As a result the botanical composition of the wetlands is changing in response to the changes in grassland management, and woody vegetation is invading the area due to the reduced frequency of cutting. This change in botanical composition will reduce the productivity of these grasslands and may have a negative effect on the drainage rate from these lands (Gutauskas,1996).

It is generally agreed that most Lithuanian grassland is in urgent need of improvement, because of undergrazing and a lack of fertilizer application to maintain basic fertility. There is also a shortage of

seed for resowing grassland. The low dairy cow yields indicated in Table 5 are mainly due to poor forage quality, which has resulted from the following factors:

- the poor species mix
- a tendency to graze over-mature grass
- late cutting for conservation resulting in low quality winter feed

5.3 Tethering of cows

It is estimated that at least 75% of Lithuanian cows are tethered (Schukking and hamnett 1998). In theory this is a rotational grazing system that can lead to efficient use of grassland but in practice it is labour intensive because of the need to carry water, move the cows and milk cows in situ. Furthermore any wet weather usually leads to poaching damage to the pasture. The high labour requirement also conflicts with early season land work since most crops are spring sown. This leads to late turnout since there is less work while cattle are still indoors. Grass growth is very rapid in the spring from late April onwards because there is usually a sudden change from cold to warm weather. Late turnout fails to catch this flush of grass growth adequately so that cattle are soon grazing headed grass with low digestibility, and milk yield may also be lost because inevitably cows do not always have adequate access to water.

5.4 Haymaking on plotter holdings

The poor quality of grassland is also due to the change in ownership, with much of the grassland and cattle in the hands of plotters who have little knowledge of grassland husbandry or feeding methods. The problem is compounded because they lack the financial and machinery resources to manage the grassland effectively. In the past the large cooperatives made a mixture of hay and silage for winter feed but the plotters now make only hay. Scythes are still in common use although cutter bar mowers are now the norm. It is then usually turned by hand and laid over hurdles to dry. This is an effective method, but very labour intensive. Horses are in common use to pull cutter bar mowers, turn and gather hay and to cart the loose, dried hay back to the barns. There are very few balers in use. The hay is usually cut from mid-June onwards.

5.5 Silage production

Silage is usually only made on the remaining bendroves. By western standards it is made too late, usually at the flowering stage. The consolidation at the clamp is often poor because the product is usually over mature and often too dry. Silos are usually sealed off with plastic sheeting but with inadequate attention to sealing at clamp sides and ends. High wastage and overheating are often the result. The emphasis is to achieve maximum harvest of dry matter rather to conserve earlier to maximize yield of digestible organic matter and feeding quality. Silage and hay quality is not helped by the indifferent quality of the swards from which they are made.

5.6 Seed production

The break up of the former cooperatives since independence has lead to a dramatic drop in seed production. Formerly Lithuania was a major producer of forage seed for the former Soviet Union, but production has decreased dramatically since 1989. For example, during 1996 legume seed production was down to 5% of the level in 1986 (Poisson, 1997); Table 6 shows the trend for legumes and forage grasses in terms of numbers of ha producing seed. The main reason for this decline has been the loss of organized production within the former cooperatives and a poor market for seed as farming has re-organized and stock numbers have declined.

Table 6. seed production (ha)

	1986	**1992**	**1996**
Legumes			
Trifolium pratense	43 850	1 000	1 801
Trifolium repens	3 236	569	106
Trifolium hybridum	1 351	80	
Onobrychis viciifolia	503		51
Others	1 048	24	28
Total legumes	**49 988**	**1 673**	**1 986**
Main grass species			
Phleum pratense	11 883	359	625
Festuca pratensis	5 350	415	230
Poa pratense	2 311	17	100
Dactylis glomerata	1 708	30	52
Total for main grass species	**21 252**	**821**	**1 007**

Source: Poisson 1997

In 1996 the average seed production per ha was approximately 25 kg for *T. pratense*, 250 kg for *T. repens*, 250 kg for *Phleum pratense* and 500 kg for *Festuca pratensis.* (Poisson, 1997).

The only legume species which has maintained significant production is *T. pratense*. At present it would be advisable to sow *T. repens,* as this is more persistent. Although forage production with *Medicago sativa ha*s potential, seed production in the field is very difficult with only 40 kg/ha produced. *Galega orientalis* is arousing new interest for milk production; the potential seed production in trials can reach 500 kg/ha but commercial production is not significant at present (Poisson, 1997).

Seed production of grass is relative to the level of usage with *Festuca pratensis* and *Phleum pratense* the main grasses. *Dactylis glomerata* is grown for silage and grazing but it is frequently under utilized while *Lolium perenne ha*s been considered too frost sensitive.

The Lithuanian Institute of Agriculture has been very active in breeding and testing new grass and legume varieties. The expertise still remains. This is an opportunity for the future if Lithuania can gain OECD (Organisation for European Co-operation and Development) standards for variety registration and seed certification.

6. OPPORTUNITIES FOR IMPROVEMENT OF PASTURE RESOURCES

At the request of the Lithuanian Government, an EU funded Phare project ('Lithuanian Grassland Management Project') began in late1994; the main partners were the Lithuanian Institute of Agriculture, the Lithuanian Institute of Animal Science and the Lithuanian Agricultural Advisory Service. The project contractors on behalf of the EU were International Project Partnerships from France. The project ended in December 1998.

The overall project objective was to improve the competitiveness of ruminant livestock production**.** This was split into more specific project objectives as detailed below:

1. **Introduction of new and appropriate technologies on grassland and grazing management systems**

   Appropriate technologies were identified as:
   - direct reseeding of grassland without necessarily using a cover crop;
   - a change from tethered grazing to free grazing;
   - continuous in place of rotational grazing for small herds;
   - the adoption of electric fencing techniques to confine animals;
   - the adoption of grazing height monitoring regimes;
   - variable stocking intensities adjusted to seasonal grass growth;
   - integration of grazing with cutting for conservation to achieve these appropriate stocking rates.
2. **Introduction of grass fodder conservation systems thar produce high quality winter feed and are suited to the different categories of farmers in Lithuania**

   Appropriate technologies were identified as:
   - big bale silage making for adoption by agro-service organisations, bendroves or through machinery sharing arrangements;
   - silage making using forage wagons, particularly for small private farmers. Second hand forage wagons are available from western countries.
   - wilted rather than direct cut silage to reduce the reliance on additives and to minimize risk of water pollution;
   - use of improved cutting and tedding machinery;
   - field clamps where silage bunker (tranche) facilities are unavailable;
   - improved sealing techniques for silos.
3. **Development of grass seed and clover seed production systems that will allow Lithuanian forage seed producers to market quality seed in the domestic and international markets**

The project was unable to directly organize seed production systems or international marketing.

Encouragement to adopt appropriate technologies was organized through expert advisory reports after studies of the facilities and organisational structure in Lithuania. Inspection protocols were also critically assessed and recommendations for change made. Further stimulus to change was provided through a study tour of Denmark and Germany to view all aspects of seed production that currently meet OECD standards.

Demonstration farms were established, mostly on emerging private farms; these were successfully used to show in practice the techniques advocated in 1 and 2 (above). Grasslands were successfully reseeded without undersowing, both in Spring and Autumn using mixtures containing cold resistant varieties of Perennial ryegrass and white clover. The demonstration farms cut grass for silage much earlier than usual in mid to late May at ear emergence stage and farmers gave up tethering cows in favour of free grazing systems using electric fencing. Silage was made using big balers, forage wagons and with precision cut forage harvesters. Field clamps were used as well as bunkers (tranches) for silage making. Forage analysis was also introduced to aid in the design of dairy cow rations to achieve better cow performance. The improved forage produced very good response in terms of better dairy cow performance (Hamnett 1998).

The Dutch and Danish governments have continued with project support to improve dairy sector performance both in terms of cow performance and subsequent milk cooling and processing. Grassland management has remained a priority within these projects. Many leaflets and booklets on grassland management subjects have been produced by the LGMP and subsequently in conjunction with the Danish agricultural advisory service. As an example, a leaflet entitled 'Pasture and Meadow Management' has recently been produced by the Lithuanian and Danish advisory services, as shown.

The fundamental problem remains an over supply of grassland for the stock numbers kept and a lack of machinery for good grassland establishment and its subsequent management. There are also no field boundaries. The utilisation of the grassland is over dependent on the dairy sector. Grazed beef finishing, suckler cows and sheep production, although encouraged by subsidies, show no sign of expansion from very low levels. Much of the land is agriculturally only suited to grass production so diversification of grazing livestock use is therefore needed. The other option is diversification into non agricultural use, such as forestry.

Nevertheless there is steady progress. This is likely to accelerate as a land market develops and plotter holdings are sold off to consolidate land into larger holdings held by private farmers whose technical expertise and resources will steadily improve. The Agriculture and Rural Development Plan 2000 – 2006 (RDP, 1999) has been submitted to the European Commission for approval to gain pre-accession aid under the SAPARD (Special Accession Programme for Agriculture and Rural Development) programme. If approved its successful implementation will help to address many of the problems highlighted within this text.

7. RESEARCH AND DEVELOPMENT ORGANIZATIONS AND PERSONNEL

Establishment and contact details	Some key personnel	Research topics/responsibilites
Lithuanian Institute of Agriculture Instituto av., 1 LT-5051 Dotuva Kedainiai Tel. (370 57) 52657 Fax. (370 57) 60996	**Dr Zenonas Dabkevicius**	Director
	Dr V Zemaitis	Head of grassland department
	Dr J Gutauskas	Grassland researcher – grassland management
	Dr J Slepytis	Grassland researcher (plant breeding)
	Dr E Lemezis	Grassland researcher (seed production)
	Prof. L Kadziulis	Grassland researcher and Chairman of Science Council
	Dr Audrone Masauskiene	Forage analysis
	Dangira Sidlauskiene	Translation and Interpreter
	Grazing system experimentation, grassland management, forage conservation. Development of grass and legume varieties	
Lithuanian Institute of Animal Science, LT-5125 Baisogala, Radviliskis raj. Tel. (370 92) 53608 Fax. (370 92) 53608	**Dr Jonas Jatkauskas**	Director
	Dr Romas Mankevicius	Deputy Director
	Prof. Vytautas Tarvydas	Animal Nutrition
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	Dr P Bendikas	Cattle management
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Lithuanian Agricultural Advisory Service, Stoties 5, LT 5051, Dotnuva, Kedainiai Tel. (370 57) 37856 Fax. (370 57) 56936	**Saulius Cironka**	Director
	Virmantas Minkevicius	Livestock Husbandry
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Lithuanian University of Agriculture, Kaunas-Akedemija, LT-4324. Tel/fax. (370 7) 298255/296500	**Prof. Albinus Kusta**	Rector
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9. GLOSSARY

EU	European Union
EUROP	Each letter indicates a carcase classification category based on based on E for the best to P for the worst
LGMP	Lithuanian Grassland Management Project
OECD	Organisation for European Co-operation and Development
SAPARD	Special Accession Programme for Agriculture and Rural Development
UAA	Utilized Agricultural Area

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