

Development of livestock in numbers and structure from the regional and administrative aspect

Vývoj stavů a struktury skotu podle územně správního hlediska

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Abstract: The contribution deals with the development of livestock since 1990. Since that year, beef and dairy cattle numbers have dropped by more than 50 percent in the Czech Republic. This decrease has been partly compensated by an increase in efficiency, yet milk production has dropped to 55% in this period and beef production to 60% compared with 1989. The declining amount of cultivated land in the Czech Republic has resulted in a decrease in the stocking rate and the corresponding production. It adversely influences the economy namely in highland areas. In this sense the high rate of permanent pastures with low stocking rate enables to efficiently exploit the EU direct payments and thus the direct payment system discriminates above all the farms in highland areas (potato and oat-growing areas and upland production areas).

Key words: livestock, milk production, meat production, stocking rate, regions

Abstrakt: Příspěvek se zabývá vývojem stavů skotu od roku 1990. Od tohoto roku do roku 2002 klesly stavy skotu a krav v České republice o více než 50 bodů. Pokles stavu skotu a krav byl zčásti vyrovnán růstem užitkovosti. I přesto produkce mléka za dané období klesla na 55 % a produkce hovězího masa na 60 % roku 1989. Snižování stupně zornění v České republice je doprovázeno snižováním hustoty skotu a tím i odpovídající produkce. To má nepříznivý vliv na ekonomiku především výše položených oblastí. V tomto smyslu vysoký podíl trvalých travních porostů s nízkou hustotou skotu neumožňuje racionálně využívat přímé platby EU a tím systém přímých plateb znevýhodňuje především podniky hospodařící ve výše položených oblastech (bramborářsko-ovesné a horské výrobní oblasti).

Klíčová slova: stavy skotu, produkce masa, mléka, hustota skotu, regiony

Production structure by the farms is defined as a small number of goods of commercial production that makes the decisive part of the performance. Production structure for Czech agriculture is made by four main sectors: grain growing (more than 24%), pig production (18.02%), milk production (17.17%) and technical crop production (12.39%). These four sectors generate 71.97% of total agricultural production in the Czech Republic (Figure 1).

Cattle breeding, considering its importance, has lost its dominance in agricultural branches but takes the seventh position in the structure of agricultural production. Poultry breeding and fodder crop production occur at the same level of production, 5–6%. Cattle breeding is dependent on the terrain and is spread in all areas and conditions. Its influence rises mainly in highlands and uplands owing to the landscape and environmental protection as well as halting depopulation in these areas.

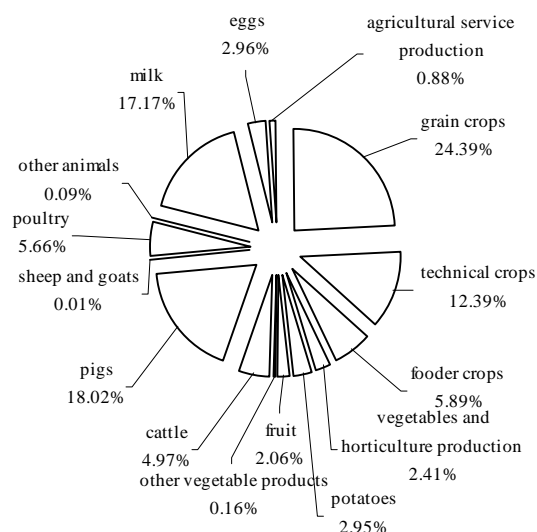


Figure 1. Structure of agricultural production in the CR

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DEVELOPMENT OF CATTLE POPULATION IN THE CZECH REPUBLIC

Since 1990, there has been a continuing decrease in cattle population in the Czech Republic (Table 1). Compared with 1990, when cattle population was 3 360 million, the number dropped to 1 520 million by 2002, which is 45%. A significant fall in cattle population was reported in the years between 1990 and 1993 during which one-year decrease of cattle population ranged between 12–15%. Since 1995, the decrease has become less and, except for 1998, ranged from 1 to 6%. In 2001, cattle population grew by 1% compared with 2000. The structure of cattle population is given in Table 2.

A similar development can be seen in the set period in cow population. Compared with the end of 1990, when there were 1 195 million cows in the Czech Republic, the

number has decreased to 596 thousand by 2002, i.e. 50%. This number decreased mainly between 1990 and 1993 when the average annual decrease ranged between 10 and 13%. In the years 1994–2002 the average annual decrease was from 1–8%.

On 1st March 2002, total cow population was 596 295, of which 495 962 were milk cows (83.2% of all cows) and 100 333 suckler cows (16.8% of all cows). Since 1996, the number of suckler cows has increased to 263% and the annual increase ranged from 14 to 23% – except in 1993.

ANNUAL MILK PRODUCTION AND AVERAGE EFFICIENCY OF DAIRY COWS

Since 1989, annual milk production has continually decreased. 4 892 billion litres of milk were produced in 1989,

Table 1. Cattle population in the Czech Republic since 1990 (in thousand)

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Cattle total	3 360	2 950	2 507	2 170	2 031	2 029	1 989	1 866	1 701	1 657	1 573	1 582	1 520
Index		0.88	0.85	0.87	0.94	1.00	0.98	0.94	0.91	0.97	0.95	1.01	0.96
Cow total	1 195	1 036	922	830	768	761	750	702	647	642	615	611	596
Index number		0.87	0.89	0.90	0.93	0.99	0.99	0.94	0.92	0.99	0.96	0.99	0.98
Suckler cows							38	46	48	59	67	82	100
Index number								1.21	1.04	1.23	1.14	1.22	1.22

Source: Czech Statistical Office

Table 2. Structure of cattle population according to sex and age

Category	1995	%	1999	%	2000	%	2001	%
Cattle total	2 029 827	100	1 657 337	100	1 573 530	100	1 582 027	100
– calves up to the age of 6 months	363 701	17.92	272 551	16.45	255 990	16.27	252 930	15.99
bullocks	176 696	8.70	130 677	7.88	121 048	7.69	123 321	7.80
heifers	187 005	9.21	141 874	8.56	134 942	8.58	129 609	8.19
Young bovine cattle (0.5–1 years)	290 725	14.32	238 805	14.41	227 029	14.43	230 478	14.57
bullocks and steers	135 765	6.69	104 981	6.33	99 193	6.30	105 021	6.64
heifers	154 960	7.63	133 824	8.07	127 836	8.12	125 457	7.93
Bovine cattle from 1–2 years	473 027	23.30	387 483	23.38	367 495	23.35	373 186	23.59
post-mating heifers	116 867	5.76	104 665	6.32	100 308	6.37	99 301	6.28
pre-mating heifers	161 164	7.94	132 514	8.00	125 694	7.99	126 351	7.99
breeding bulls	827	0.04	372	0.02	361	0.02	528	0.03
other bulls	194 169	9.57	149 932	9.05	141 132	8.97	147 006	9.29
Bovine cattle from 2 years	902 374	44.46	758 498	45.77	723 016	45.95	725 433	45.85
breeding bulls	795	0.04	1 583	0.10	1 531	0.10	2 000	0.13
other bulls and steers	29 062	1.43	21 038	1.27	21 119	1.34	23 497	1.49
post-mating heifers	87 215	4.30	79 169	4.78	74 514	4.74	74 408	4.70
pre-mating heifers	17 066	0.84	14 682	0.89	11 065	0.70	14 097	0.89
post-mating cows	541 736	26.69	465 550	28.09	446 371	28.37	442 580	27.98
beef breed	.	.	43 724	2.64	48 144	3.06	58 831	3.72
pre-mating cows	226 500	11.16	176 476	10.65	168 416	10.70	168 851	10.67
beef breed	.	.	15 001	0.91	19 150	1.22	23 495	1.49

Table 3. Annual milk production and average annual milk yield

Index	Unit	1989	1995	1996	1997	1998	1999	2000	2001	2002
Milk production	mil. l	4 900	3 031	3 039	2 703	2 716	2 736	2 708	2 702	2 731
Index number			0.62	1.00	0.89	1.00	1.01	0.99	1.00	1.01
Average annual milk yield	l/pieces /year	3 982	4 117	4 301	4 366	4 837	5 022	5 255	5 589	5 690
Index number			1.03	1.04	1.02	1.11	1.04	1.05	1.06	1.02

Source: Ministry of Agriculture – commodity report Milk, 2003

but in 2002 only 2 731 billion litres were produced, i.e. 55.8% of 1989 production. Initially, the decrease of milk production dropped rapidly in the years between 1989 and 1995, by 38%. Between 1995 and 2002, the annual difference in milk production ranged from +1 to -1%. The only exception was in 1997 when the annual decrease of milk production reached 11% (Table 3).

Dairy cow population decrease is partly matched by efficiency. The average annual milk yield in 1989 amounted to 3 982 litres per dairy cow while in 2001 it was 5 690 litres, which means an increase of 43%. The periods of differing increase can be followed in the average milk yield in one year. In 1989–1995, the increase was slight, just 3%. On the other hand, during the following period 1995 to 2001, milk yield increased by 35%. In 1995 to 2002, the annual increase of milk yield from dairy cows ranged between 2 and 6%. The only exception was 1998 when the milk yield increased by 11%.

Table 4 presents total milk production and dairy cow efficiency in the regions of the Czech Republic in 2001. The Vysočina region, as usual, has the highest share of

milk production, 16% of total production, i.e. 433 million litres. The efficiency is by 3.7% higher than the republic average. In contrast, the lowest share belongs to the Karlovarský region with 35.5 million litres, i.e. 1.3% of total production. The average annual efficiency is also the lowest in this region, by 16% compared with the republic average.

The Moravskoslezský region has the highest average efficiency per year – 6 216 litres per head per year, which exceeds the republic average by 11.2%. The share of this region's total milk production is 6.3%. In general terms, above-average efficiency is found in all Moravian regions and in Eastern Bohemia, whilst below-average efficiency is in the North-West regions of the republic.

ANNUAL BEEF PRODUCTION AND AVERAGE WEIGHT GAIN

As well as milk production, beef production has been decreasing since 1989. In that year, 518.5 thousand tons of beef were produced in the Czech Republic. Having dropped steadily, the production was 208 thousand tons by 2000. A slight growth in beef production followed in 2001, to 208.5 thousand tons, which means 40% of 1989 production. The greatest production decrease of 40% was reported between 1989 and 1994. In 1995, production grew by 3% and in 1996, 1997 and 1999, the annual decrease in meat production ranged between 4 and 5%. In 1998 and 2000, the production dropped again, by 16 and 12%. From 2000 to 2002, the production changed by the maximum of 1% (Table 5). According to estimates, beef production in 2002 was 206 thousand tons.

As well as the dairy cow efficiency, beef cattle fattening efficiency has been growing but the growth is not as acute as dairy cow efficiency. The average daily gain in 1989 was 0.75 kg per head and 0.87 kg in 2001 – a 16% growth. The greatest annual growth in cattle efficiency was reported in 1999, by 10%. That year marked a turning point in cattle fattening efficiency, for in 1989–1998 the efficiency ranged from 0.74 kg to 0.80 kg per head per day but since then the efficiency has grown from 0.86 to 0.88 kg per head per day.

Table 6 presents the development of cattle slaughtering in tons of slaughter weight by categories in 1997–2001. In 1997, 148 thousand tons of cattle were slaughtered while in 2001 it was only 106 thousand tons, which means

Table 4. Share of regions in total milk production in 2001

Region	Milk production		Average milk yield	
	million litres	%	litres	%
Czech Republic	2 701.8	100.0	5 588.2	100.0
2 Středočeský*	353.5	13.1	5 610.1	100.4
3 Jihočeský	351.0	13.0	5 110.0	91.4
4 Plzeňský	259.2	9.6	5 172.1	92.6
5 Karlovarský	35.5	1.3	4 693.9	84.0
6 Ústecký	68.6	2.5	5 405.7	96.7
7 Liberecký	54.2	2.0	5 037.0	90.1
8 Královéhradecký	224.4	8.3	5 690.4	101.8
9 Pardubický	245.9	9.1	5 719.6	102.4
10 Vysočina	433.0	16.0	5 796.2	103.7
11 Jihomoravský	181.2	6.7	5 993.3	107.3
12 Olomoucký	191.6	7.1	5 675.8	101.6
13 Zlínský	133.3	4.9	6 051.7	108.3
14 Moravskoslezský	170.3	6.3	6 216.0	111.2

Source: Czech Statistical Office

*including the capital

Table 5. Beef production and efficiency

Index	Unit	1989	1994	1995	1996	1997	1998	1999	2000	2001
Beef production	thousand t	518.5	313.3	322.9	310.4	293.6	246.6	237.4	208.0	208.5
Index number			0.60	1.03	0.96	0.95	0.84	0.96	0.88	1.00
Average cattle weight gain	kg/pieces/day	0.75	0.74	0.78	0.80	0.77	0.78	0.86	0.88	0.87
Index number			0.99	1.05	1.03	0.97	1.01	1.10	1.02	0.99

Source: Ministry of Agriculture – Green Report 2001

Table 6. Cattle slaughtering in tons of slaughter weight according to categories

	1997	1998	1999	2000	2001
Cows	59 625	49 414	47 578	37 449	35 717
in %	40.3	37.4	37.5	34.6	33.7
Bulls	70 324	67 998	66 227	60 613	61 034
in %	47.5	51.5	52.1	56.0	57.6
Heifers	15 325	12 513	11 478	9 364	8 549
in %	10.4	9.5	9.0	8.7	8.1
Calves	2 726	2 075	1 717	735	745
in %	1.8	1.6	1.4	0.7	0.7
Cattle total	148 000	132 000	127 000	108 161	106 045
Mature cattle	145 274	129 925	125 283	107 426	105 300
in %	98.2	98.4	98.6	99.3	99.3

Source: Czech Statistical Office

Table 7. Beef and veal production in slaughter weight within the CR regions in 2001

Region	Beef production		Veal production	
	t	%	t	%
Czech Republic	105 300	100	745	100
2 Středočeský*	9 219	8.75	91	12.21
3 Jihočeský	15 717	14.93	139	18.66
4 Plzeňský	8 342	7.92	55	7.38
5 Karlovarský	2 040	1.94	4	0.54
6 Ústecký	6 054	5.75	31	4.16
7 Liberecký	2 748	2.61	14	1.88
8 Královéhradecký	7 564	7.18	83	11.14
9 Pardubický	10 936	10.39	148	19.87
10 Vysočina	13 452	12.77	49	6.58
11 Jihomoravský	6 218	5.91	27	3.62
12 Olomoucký	7 866	7.47	31	4.16
13 Zlínský	8 412	7.99	40	5.37
14 Moravskoslezský	6 732	6.39	33	4.43

Source: Czech Statistical Office

* including Prague

a decrease by 28%. The rate of the mentioned categories of slaughtered cattle changed considerably, too. The least decrease has been reported in bull slaughtering, by 13%. There were only 47.5% of slaughtered bulls of the total slaughtered cattle in 1997 while in 2001 the number of slaughtered bulls in tons stood at 57.6% of total slaughtered cattle. In contrast, the greatest decrease was mentioned in the rate of slaughtered calves in tons of total number of slaughtered cattle in tons, i.e. from 1.8% in 1997 to 0.7% in 2001. 2 726 tons of calves were slaughtered in 1997 and only 745 tons in 2001 which means a decrease of 73%. Cow and heifer slaughter dropped by 40% for cows and 44% for heifers during the years 1997–2001.

The share of the regions of the Czech Republic in beef and veal production is presented in Table 7. The Jihočeský region had the highest share of beef production in 2001 with 15 717 tons, i.e. almost 16%. The highest share of veal, 148 tons, was produced in the Pardubický region, 20% of total veal production in the republic. The lowest share in beef and veal production belongs to the Karlovarský region, less than 2% of beef and 0.54% of veal production. Mass beef and veal producers have appeared in the regions: Jihočeský, Vysočina, Pardubický and Středočeský (including Prague). In these four regions, almost 47% of beef and more than 57% of veal was produced in 2001.

ACREAGE OF AGRICULTURAL LAND AND STOCKING RATE

Agricultural land occupies about 54.3% of the total area in the Czech Republic and represents 4.28 million hectares. The largest part of the farmland, 3 082 thousand hectares (39% of total area), is used as arable land, 961 thousand hectares of the farmland are meadows and pastures (22.4%). The hop garden area is 11 thousand hectares and vineyards occupy an area of 15.5 thousand hectares. Since 1989, the area of meadows and pastures has grown by more than 36%.

In the Czech Republic, in average 36.96 cattle were reported per 100 hectares of farmland in 2001. The average number of beef cattle population was 14.3 per 100 hectares of farmland and the average number of dairy cows was 12.36 per 100 hectares of farmland, which is 72% of 1995 rate. The number of suckler cows was 1.9 per 100 hectares of farmland.

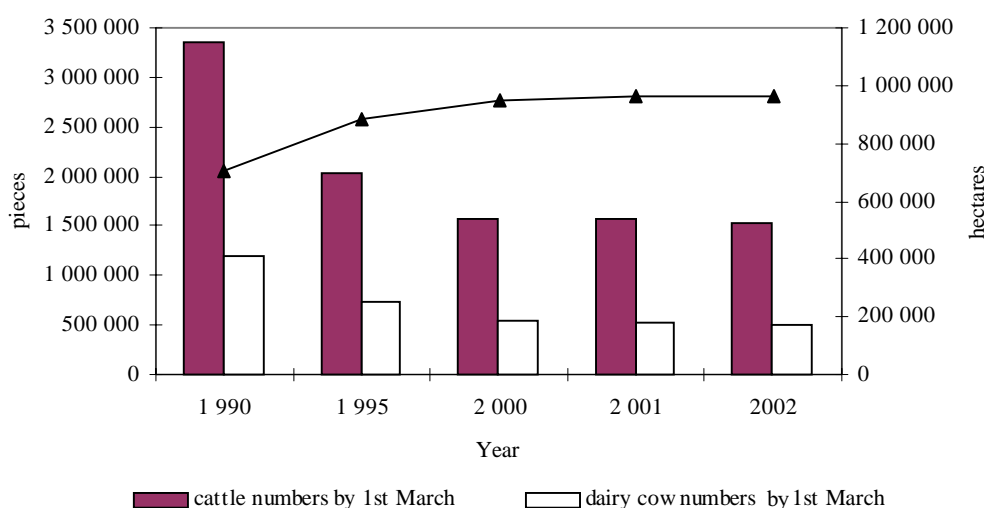


Figure 2. Development of cattle numbers in CR

The stocking rate on permanent pastures was 1.65 per hectare by 1st March 2001, the cow number 0.636/ha, the milk cow number 0.55/ha and suckler cow number 0.086 per ha of permanent pastures.

The development of cattle population has been reversely proportionate to the development of meadows and pastures. While the acreage of meadows and pastures in the Czech Republic has risen under the influence of larger grassing in potato-growing, potato and oat-growing and upland production regions, cattle and dairy cow population has decreased (Figure 2). A marked trend of a drop in stocking rate results in many unpleasant

consequences. Above all, the decrease of stocking rate in marginal regions affects the decrease of farm production followed by profitability decrease. Low stocking rate makes it impossible to utilize the advantages of the EU direct payments.

STOCKING RATE WITHIN REGIONS

Comparing the stocking rate in regions, then (not mentioning the region of Prague) the lowest stocking rate was in 2001 in the Karlovarský region with 30 277 of cat-

Table 8. Stocking rate in LU/ha within regions

Region	Stocking rate LU/ha farmland						Stocking rate LU/ha permanent pastures					
	cows		cattle total		sheep		cows		cattle total		sheep	
	1995	2001	1995	2001	1995	2001	1995	2001	1995	2001	1995	2001
Czech Republic	0.179	0.143	0.354	0.276	0.0039	0.0021	0.866	0.636	1.707	1.228	0.0186	0.0094
Prague	0.025	0.016	0.057	0.032	0.0013	0.0005	0.597	0.390	1.397	0.786	0.0322	0.0119
Středočeský	0.149	0.104	0.298	0.214	0.0036	0.0016	1.437	1.007	2.875	2.065	0.0345	0.0158
Jihočeský	0.210	0.184	0.414	0.352	0.0039	0.0028	0.720	0.570	1.420	1.088	0.0134	0.0086
Plzeňský	0.191	0.173	0.397	0.337	0.0058	0.0030	0.733	0.632	1.523	1.232	0.0222	0.0111
Karlovarský	0.123	0.105	0.236	0.180	0.0040	0.0040	0.303	0.208	0.583	0.356	0.0098	0.0080
Ústecký	0.101	0.069	0.223	0.130	0.0036	0.0016	0.500	0.279	1.099	0.530	0.0178	0.0065
Liberecký	0.174	0.122	0.306	0.214	0.0050	0.0019	0.432	0.282	0.760	0.497	0.0125	0.0043
Královéhradecký	0.236	0.170	0.443	0.325	0.0041	0.0023	0.987	0.680	1.852	1.305	0.0172	0.0092
Pardubický	0.237	0.185	0.437	0.357	0.0027	0.0022	1.127	0.853	2.079	1.650	0.0130	0.0102
Vysočina	0.230	0.223	0.469	0.426	0.0032	0.0012	1.151	1.132	2.339	2.164	0.0160	0.0059
Jihomoravský	0.136	0.080	0.273	0.165	0.0015	0.0008	2.020	1.221	4.053	2.512	0.0218	0.0117
Olomoucký	0.195	0.148	0.392	0.291	0.0054	0.0011	1.239	0.823	2.493	1.621	0.0346	0.0062
Zlínský	0.171	0.146	0.325	0.278	0.0051	0.0051	0.633	0.516	1.202	0.985	0.0189	0.0179
Moravskoslezský	0.167	0.133	0.311	0.238	0.0047	0.0027	0.656	0.436	1.220	0.782	0.0185	0.0090

Source: Czech Statistical Office

tle population, of which 4 929 were dairy cows. The highest number was reported in the Vysočina region – 240 330 cattle, of which 91 084 were dairy cows.

The average stocking rate in LU/ha of farmland in the Czech Republic was 0.276 LU/ha in 2001. A lower stocking rate was in the regions: Ústecký (0.130 LU/ha), Karlovarský (0.180 LU/ha), Jihomoravský (0.165 LU/ha), Středočeský (0.214 LU/ha), Liberecký (0.214 LU/ha) and Moravskoslezský (0.238 LU/ha). Higher stocking rate compared to the republic average was in the regions: Vysočina (0.426 LU/ha), Pardubický (0.357 LU/ha), Jihočeský (0.352 LU/ha), Plzeňský (0.337 LU/ha), Královéhradecký (0.325 LU/ha), Olomoucký (0.291 LU per ha) and Zlínský (0.278 LU/ha).

The average stocking rate on permanent pastures in the Czech Republic was 1.228 LU/ha in 2001. The following regions appeared below average: Karlovarský (0.356 LU per ha), Liberecký (0.497 LU/ha), Ústecký (0.530 LU/ha), Moravskoslezský (0.782 LU/ha), Zlínský (0.985 LU/ha) and Jihočeský (1.088 LU/ha). On the contrary, the above-average stocking rate was reported in the regions: Jihomoravský (2.512 LU/ha), Vysočina (2.164 LU/ha), Středočeský (2.065 LU/ha), Pardubický (1.65 LU/ha), Olomoucký (1.621 LU/ha), Královéhradecký (1.305 LU/ha) and Plzeňský (1.232 LU/ha) (Table 8).

Permanent pastures represent 22.4% of the farmland of the Czech Republic. This share is the lowest in the regions: Jihomoravský (6.58%), Středočeský (10.36%), Olomoucký (17.95%), Vysočina (19.68%) and Pardubický (21.66%). Higher share of permanent pastures in the farmland is in the regions: Karlovarský (50.52%), Liberecký (43.12%), Jihočeský (32.32%), Moravskoslezský (30.42%), Zlínský (28.24%), Plzeňský (27.33%), Královéhradecký (24.93%) and Ústecký (24.61%).

To illustrate the use of permanent pastures for sheep grazing, we can compare the number of sheep population in the regions. As apparent from Table 8, sheep rate per hectare of farmland in the Czech Republic had dropped by 2001 to 53% of 1995 state. The average rate was 0.0021 LU/ha in 2001. The following regions appeared above average: Jihočeský, Plzeňský, Karlovarský, Královéhradecký, Pardubický, Zlínský and Moravskoslezský. The other regions were below average: Středočeský, Ústecký, Liberecký, Vysočina, Jihomoravský, Olomoucký. The highest amount of cattle on farmlands (0.0051 LU per ha) and permanent pastures (0.0179 LU/ha) was in the Zlínský region in 2001. Permanent pastures make 28% of the acreage of the farmland in this region. Sheep numbered 90 241 in 2001, most of them bred in the Jihočeský region – 3 742. Sheep and goat breeding share in the total farm production is 0.01%, so its importance is not so high in the Czech Republic.

STOCKING RATE ON THE LAND WITHIN THE DISTRICTS

In comparison with 1995, cattle population dropped to 78% in the Czech Republic in 2001. The decrease in the district of Teplice, to 42% of 1995 level, is considered to be of high account. Only four districts could report the growing number of cattle compared with 1995: Klatovy (101%), Sokolov (102%), Vsetín (104%) and Ústí nad Orlicí (107%). The greatest number of cattle was in the district of Žďár nad Sázavou (60 012; of which 23 732 are dairy cows) and the lowest one in Teplice (522, of which only 84 are dairy cows) by 1st March 2001.

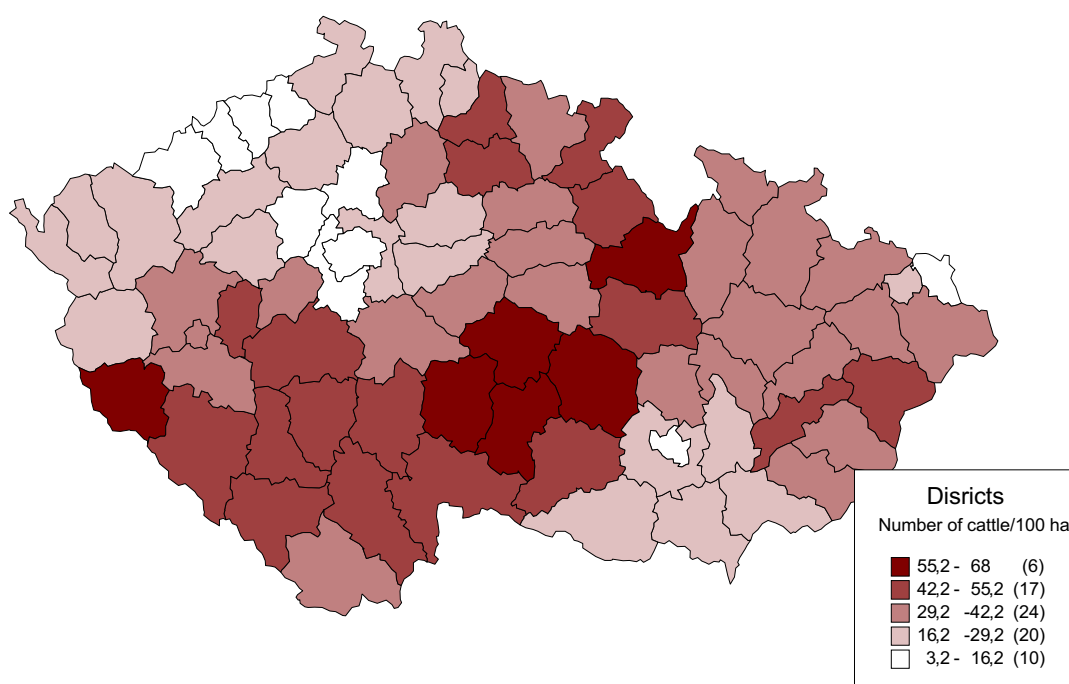


Figure 3. Cattle population within districts

Table 9. District division according to share of permanent pastures in farmland

		Stocking rate in LU/ha f.l.	Share of LFA in %	Middle altitude		Stocking rate in LU/ha f.l.	Share of LFA in %	Middle altitude	
Share of permanent pastures/ha farmland to 10 %	Znojmo	0.131	16.8	346	Share of permanent pastures/ha farmland 10–20 %	Třebíč	0.359	63.5	491
	Kladno	0.118	29.3	331		Olomouc	0.292	17.5	440
	Vyškov	0.211	3.9	394		Kutná Hora	0.281	26.1	387
	Brno-město	0.078	0.0	335		Hradec Králové	0.295	0.2	268
	Nymburk	0.180	0.0	232		Hodonín	0.138	9.6	490
	Mělník	0.113	8.7	333		Plzeň-město	0.219	0.0	337
	Břeclav	0.133	0.8	351		Pardubice	0.226	3.6	300
	Brno-venkov	0.175	11.2	372		Karviná	0.041	40.9	311
	Kolín	0.158	1.9	352		Opava	0.264	36.7	474
	Praha-východ	0.131	20.8	344		Plzeň-sever	0.286	88.2	478
	Rakovník	0.142	79.9	418		Ostrava-město	0.185	0.0	271
	Louny	0.131	64.6	361		Jičín	0.346	12.5	361
	Praha-západ	0.088	48.2	363		Beroun	0.292	75.4	416
	Prostějov	0.286	27.2	466		Nový Jičín	0.272	53.2	681
	Mladá Boleslav	0.244	1.1	317		Benešov	0.284	82.9	467
	Kroměříž	0.319	4.7	525					
	Litoměřice	0.170	32.0	489					
	Přerov	0.304	13.7	422					
	Share of permanent pastures/ha farmland to 20–30 %	Uherské Hradiště	0.253	20.6		570	Share of permanent pastures/ha farmland to 30–50 %	Ústí nad Orlicí	0.506
Rokycany		0.363	83.0	486	Jeseník	0.246		92.0	813
Chrudim		0.277	41.4	499	Rychnov n. Kněžn.	0.371		63.9	461
Svitavy		0.368	55.6	524	Chomutov	0.082		94.8	723
Blansko		0.307	56.3	478	Zlín	0.219		70.4	509
Pelhřimov		0.448	100.0	582	Česká Lípa	0.137		42.6	513
Písek		0.348	73.3	519	Teplice	0.024		48.5	536
Most		0.080	53.8	580	Trutnov	0.272		81.2	933
Havlíčkův Brod		0.431	85.8	481	Liberec	0.178		81.3	666
Tábor		0.356	75.9	539	Cheb	0.173		88.6	619
Jihlava		0.419	99.1	630	Klatovy	0.401		93.0	865
Plzeň-jih		0.310	70.5	476	Frydek-Místek	0.261		75.3	775
České Budějovice		0.372	64.9	689	Šumperk	0.299		64.3	856
Příbram		0.366	83.9	553	Semily	0.364		80.8	836
Žďár nad Sázavou		0.477	100.0	546					
Strakonice		0.353	83.3	610					
Náchod		0.341	56.3	439					
Tachov		0.197	90.6	555					
Jindřichův Hradec		0.380	92.7	590					
Domažlice	0.476	85.0	699						
Share of permanent pastures/ha farmland > 50 %	Karlovy Vary	0.202	95.0	782					
	Bruntál	0.224	89.6	848					
	Vsetín	0.333	90.7	737					
	Prachatice	0.336	95.2	894					
	Děčín	0.185	85.1	445					
	Český Krumlov	0.285	100.0	875					
	Ústí nad Labem	0.094	90.9	433					
	Jablonec nad Nisou	0.181	96.0	670					
Sokolov	0.128	97.5	683						

Source: Czech Statistical Office

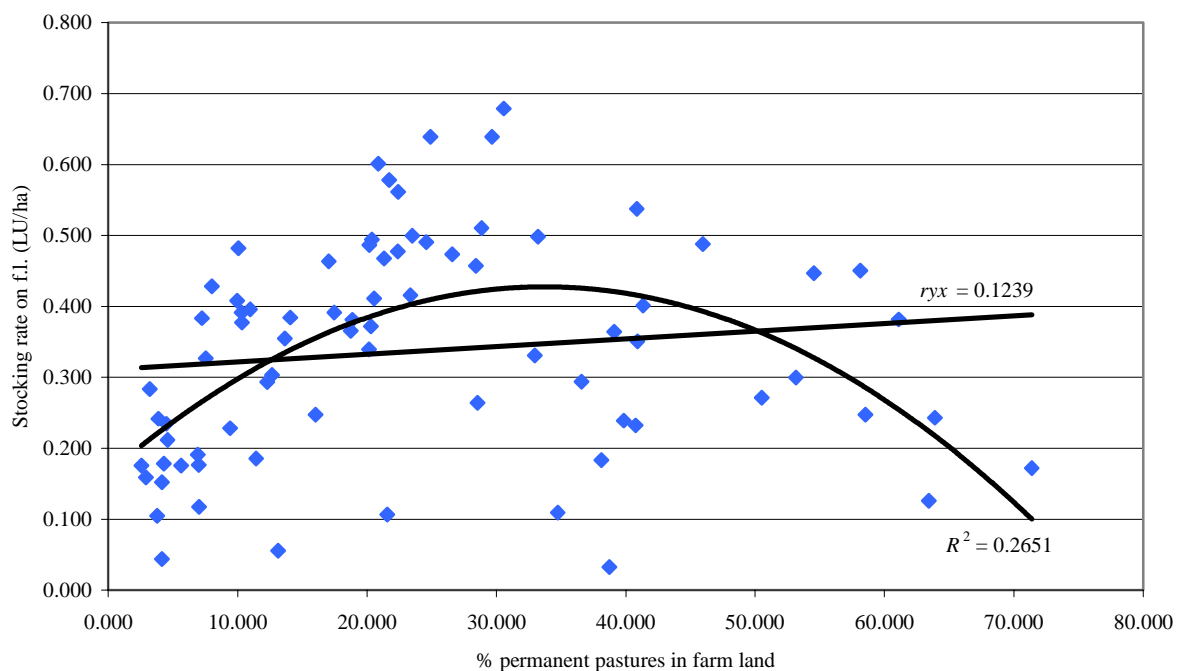


Figure 4. Dependence of stocking rate on farmland in percentual share of permanent pastures in farm land in 2001 (in districts)

As the area with the highest cattle population on farmland, there can be considered the strip running from the South-West of Bohemia through the Highlands to the East of Bohemia where cattle population outnumbers 40 per 100 hectares of farmland. A below-averaged number is in Central and Northern Bohemia (Figure 3).

The average stocking rate per hectare of the farmland in the Czech Republic is 0.276 LU. Comparing the districts in 2001, the highest rate was reported in Ústí nad Orlicí (0.506 LU/ha), Žďár nad Sázavou (0.477 LU/ha),

Domažlice (0.476 LU/ha), Pelhřimov (0.448 LU/ha), Havlíčkův Brod (0.431 LU/ha), Jihlava (0.419 LU/ha) and Klatovy (0.410 LU/ha). These seven districts breed 21% of the cattle population of the whole republic, i.e. 332 551.

The average stocking rate per hectare of farmland in the Czech Republic is 0.276 LU/ha. As is obvious from Table 9, both in districts with a low share of permanent pastures on farmland and in districts with higher share the stocking rate is below-average (Figure 4). The districts with the highest stocking rate on farmland present

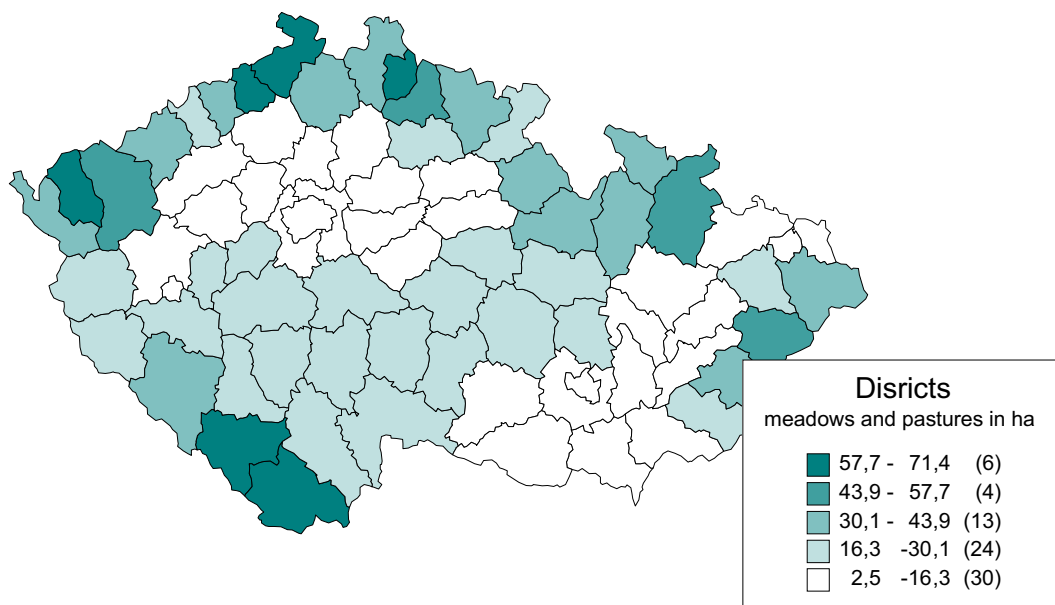


Figure 5. Permanent pastures in hectares

between 20 and 30% of permanent pastures. With few exceptions, the share of the acreage of less favoured areas in the districts and the middle altitude increases together with a higher share of permanent pastures in farmland. In general, the share of permanent pastures in farmland increases in dependence on rising altitude and together, the extension of cattle breeding can be reported.

STOCKING RATE ON PERMANENT PASTURES IN DISTRICTS

Farmland acreage in 2001 almost equals that in 1995, it decreased only slightly to 99.9%. Only in the district of Šumperk did the acreage drop to 72% of 1995 followed by a drop in permanent pastures, to 91% of 1995. On the contrary, the acreage in the Czech Republic increased to 108% of 1995. It increased mainly in the districts of Sokolov (157%), Ústí nad Labem (143%), Bruntál (138%) and Český Krumlov (136%) (Figure 5).

The average stocking rate per hectare of permanent pastures was 1.228 LU in the Czech Republic in 2001. The largest number of cattle is in the districts with the stocking rate between 1.5–2.0 LU/ha of permanent pastures – 407 380 – which represents almost 26% of the cattle in the Czech Republic.

Table 10 divides the districts according to the stocking rate in LU/ha of permanent pastures, the share of permanent pastures in farmland and the share of the acreage of LFA in the total district acreage. The districts with the lowest stocking rate, to 0.4 LU/ha of permanent pastures, report quite a high share of the acreage from 40.9 to 99.5 in less favoured areas. As it is obvious from the table, they are the districts situated at the altitude between 311 and 782 metres and the share of permanent pastures in farmland ranges between 13.12–71.38% in these districts. In the districts where the stocking rate is from 0.4 to 0.7 LU

per ha middle altitude range from 509 to 933 metres, the share of LFA in these districts is between 70.4–100% and the share of permanent pastures between 28.5–61.1%. As given in the table, it concerns the districts situated at high altitude, with a high share of less favoured areas and a high share of permanent pastures, however, the stocking rate on permanent pastures in these districts is significantly below-average.

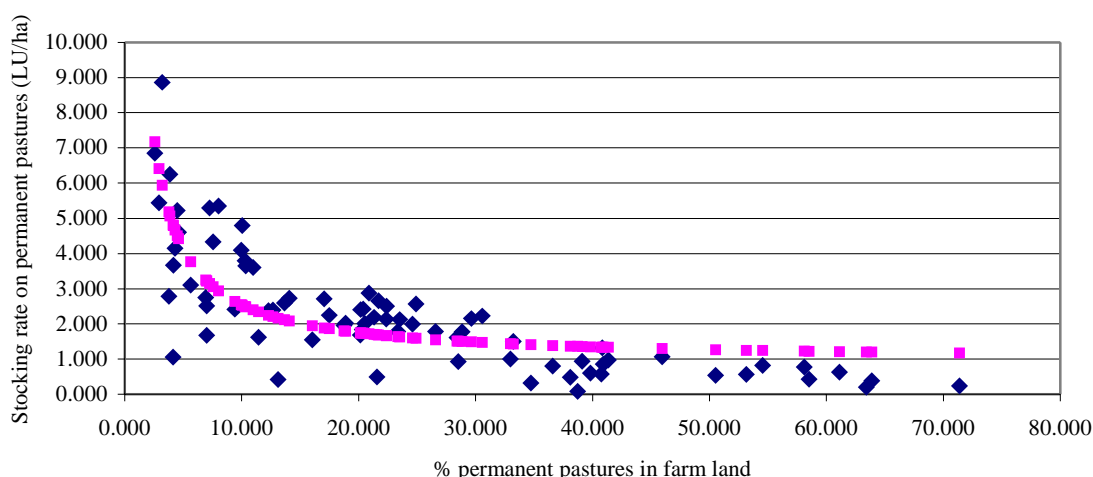
Contrary, in the districts with the highest stocking rate on permanent pastures, the share of LFA in the total acreage is very low, except the district of Třebíč, the share ranges from 0 to 29.3%. It concerns the districts situated at low altitude ranged between 232 and 491 metres and the share of permanent pastures in these districts is between 2.56 and 10.05%.

If we compare the districts according to altitude, we can see that the highest number of livestock on the permanent pastures is in districts up to the height of 525 metres. In contrast, in districts situated higher than 700 metres, the stocking rate on permanent pastures is below-average and in no district is above 1 LU/ha of permanent pastures. As given in Figure 6, the stocking rate decreases independent of the growing share of permanent pastures.

Considering the structure of the direct payments which will be paid to the farmers after joining the European Union and comparing them with the above-mentioned facts, it is obvious that both the low share of the arable land and the low stocking rate in uplands will result in lower direct payments compared with the production areas.

CONCLUSION

In the Czech Republic, the cattle population decreased by more than 50% between 1989 and 2001 and beef con-



The model can be figured in: $\text{stocking rate} = 0.94778 + 15.995797/\text{permanent pastures}$
 index of correlation = 0.78446712
 index of determination = 0.61538866

Figure 6. Stocking rate on permanent pastures in dependence on the share of permanent pastures in farm land

Table 10. Division of districts in accordance to stocking rate in LU/ha on permanent pastures in 2001

Stocking rate to 0.4	Share of permanent pastures/ha in %	Share of LFA in %	Middle altitude	Stocking rate 0.4–0.7	Share of permanent pastures/ha in %	Share of LFA in %	Middle altitude
Teplice	38.72	48.5	536	Bruntál	53.15	89.6	848
Ústí nad Labem	63.42	90.9	433	Cheb	40.75	88.6	619
Sokolov	71.38	97.5	683	Liberec	39.83	81.3	666
Chomutov	34.73	94.8	723	Český Krumlov	61.11	100.0	875
Jablonec/Nisou	63.89	96.0	670	Prachatice	58.12	95.2	894
Karviná	13.12	40.9	311	Zlín	36.59	70.4	509
Děčín	58.51	85.1	445	Vsetín	54.54	90.7	737
Česká Lípa	38.11	42.6	513	Frýdek-Místek	40.91	75.3	775
Most	21.57	53.8	580	Tachov	28.52	90.6	555
Karlovy Vary	50.52	95.0	782	Trutnov	39.10	81.2	933
Stocking rate 0.7–1.5	Share of permanent pastures/ha in %	Share of LFA in %	Middle altitude	Stocking rate 1.5–2.0	Share of permanent pastures/ha in %	Share of LFA in %	Middle altitude
Šumperk	41.34	64.3	856	Benešov	18.87	82.9	467
Jeseník	32.97	92.0	813	Č. Budějovice	23.51	64.9	689
Semily	45.94	80.8	836	Tábor	22.36	75.9	539
Klatovy	40.84	93.0	865	Domažlice	29.65	85.0	699
Rychnov a.Kněžn.	33.22	63.9	461	Písek	21.32	73.3	519
Ostrava-město	16.02	0.0	271	Ústí nad Orlicí	30.57	61.5	427
Náchod	28.40	56.3	439	Beroun	17.48	75.4	416
Hodonín	11.44	9.6	490	Plzeň-město	12.30	0.0	337
Praha-západ	7.02	48.2	363	Pardubice	12.67	3.6	300
Uherské Hradiště	20.16	20.6	570	Rokycany	20.17	83.0	486
Jindřich. Hradec	28.86	92.7	590	Litoměřice	9.42	32.0	489
Plzeň-jih	23.36	70.5	476	Svitavy	20.38	55.6	524
Strakonice	26.59	83.3	610	Jihlava	22.40	99.1	630
Chrudim	20.30	41.4	499	Louny	7.00	64.6	361
Nový Jičín	18.74	53.2	681	Žďár a. Sázavou	24.91	100.0	546
Příbram	24.59	83.9	553	Opava	13.66	36.7	474
Blansko	20.54	56.3	478	Havlíčkův Brod	21.71	85.8	481
Stocking rate 2.0–3.0	Share of permanent pastures/ha in %	Share of LFA in %	Middle altitude	Stocking rate > 3.0	Share of permanent pastures/ha in %	Share of LFA in %	Middle altitude
Jičín	17.05	12.5	361	Přerov	9.96	13.7	422
Plzeň-sever	14.07	88.2	478	Břeclav	4.29	0.8	351
Rakovník	6.91	79.9	418	Mladá Boleslav	7.55	1.1	317
Brno-město	3.77	0.0	335	Kolín	4.59	1.9	352
Pelhřimov	20.87	100.0	582	Třebíč	10.05	63.5	491
Praha-východ	5.65	20.8	344	Brno-venkov	4.49	11.2	372
Hradec Králové	10.97	0.2	268	Prostějov	7.24	27.2	466
Kutná Hora	10.33	26.1	387	Kroměříž	8.01	4.7	525
Mělník	4.15	8.7	333	Kladno	2.92	29.3	331
Olomouc	10.30	17.5	440	Nymburk	3.87	0.0	232
				Znojmo	2.56	16.8	346
				Vyškov	3.20	3.9	394

Source: Czech Statistical Office

sumption dropped by more than 60%. The efficiency of both milk production and cattle fattening also continues to grow. Permanent pasture acreage increases mostly in highlands and uplands because of the unprofitability of tilling of these plots. Mostly they are in highland, sloping or hardly accessible plots. From the aspect of environment and soil conservation, the increase is still insufficient and it needs to be continued. The question is how to use these plots effectively.

Utilisation of these areas for sheep breeding cannot be fully provided now as sheep population is very low. Since 1990, the sheep population has dropped by 77% as well as lamb and mutton consumption, it is about 0.1kg per inhabitant in the Czech Republic. Another opportunity is to use organic matter as an alternative energy resource but this usage is limited. For these reasons, the most important way of keeping less favoured areas is to graze the cattle on permanent pastures. It is necessary to extend all possible ways how to use these areas especially because of landscape conservation, improving the environment, the quality of subterranean and superficial water, stopping the rural depopulation and total improvement of the way of life in less favoured areas.

The cattle allocation in the Czech Republic does not agree with the structure of direct payments paid to the farmers in the European Union. Their amount in uplands will be much lower because the livestock payments, when the stocking rate is below 1.8 LU/ha of permanent pastures, cannot compensate the loss on grassing the arable land. The necessity of keeping farm production as the main factor of the development of less favoured areas, the necessity of increasing employment and landscape protection lead to the connection of two main factors of the CAP – the significant growth of the stocking rate in

uplands and the compensation of unfavourable impact of the differential rent and low direct payments by the compensatory allowance to the LFA in terms of the HRDP.

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