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EXTENSION WORK IN MILK AND BEEF PRODUCTION IN SLOVENIA

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Abstract

In CEE countries a trend of decreased milk and beef production has been observed after the year 1990. In Slovenia, milk deliveries increased 30 % in this period, while veal and beef production stayed at the same level as it was in 1990. Milk yield of recorded cows increased from 4.131 kg in 1990 to 5.561 kg in 2002, and the percentage of recorded cows from 33 to 66 % of all dairy cows. Both, microbiological and hygienic quality of milk substantially improved. In 1994, only 60 % of purchased milk contained less than 100,000 m.o./ml, and 97 % in 2002. In the same period the percentage of milk with less than 400,000 SCC/ml increased from 75 to 93 %. The improvements are mostly due to the efficient extension work, backed by the Zootechnical Department of Biotechnical Faculty. Up to the year 1990, the extension work was performed through farm cooperatives, partly financed by the state. After the independence of Slovenia the extension work became part of the Ministry of Agriculture and was financed from the state budget. Since 2000, extension work as well as milk recording and animal breeding have been under the responsibility of the Agricultural and Forestry Chamber. The government finances most of these activities. These changes ensured the continuation of successful extension work. Recently, a change of A4 to alternating (AT) recording method is proposed. Concerning quality, further activities are under way to improve research, educational and extension work.

Introduction

Cattle production is the most important agricultural activity in Slovenia. Slovene farmers get 40% income from produced milk and meat. It has been

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like this since the second half of the 20th century. Cattle production has always contributed a significant part of animal proteins in people's diet. In Slovenia cattle production is specially important also because two thirds of agricultural land is covered with grass. It is in most cases cattle which helps to keep our land cultivated. Therefore it is easy to understand, that cattle production has always gained special attention of experts and the current agricultural policy. These are the main reasons why in Slovenia, even before its independence in the year 1991, the expert extension service has been well developed. Also the applied research work has been very interested in solving the production problems on our farms. To understand the recent cattle production and development it is important to get acquainted with the work of our extension services. The second important segment is to know the ways of our scientific work - research organizations, especially of Biotechnical Faculty, and their part in solving today's problems, as well as creating plans for future development and starting of new programmes. Because of the successful extension services and its cooperation with research organizations it is possible to explain the production quality and quantity in Slovenia in comparison with other CEEC countries.

The history and organization of extension services required for the needs of cattle production

The extension services in cattle production started towards the end of 19th century, when teachers of cattle husbandry were introduced and employed by the Austro-Hungarian monarchy. Between the World War I and II, the development in this direction almost stopped. After the World War II, the government abolished the agricultural co-operatives of the Soviet type and started with classical co-operative work in 1952 and 1953 once again, which offered some experts to give advice to farmers. Their activities continued until the year 1960, when the agricultural co-operative work ended. After that came 5 years of forced socialization of Slovene agriculture. The politicians were absolutely sure the big combinates (large farming enterprises) will produce enough food for everyone and keep the land cultivated. But the deficit of agricultural products was getting worse and in connection with the economic reform in the year 1965 the new idea was born. The new ideal was, that co-operating farmer produced agricultural products for large enterprises through contract (combinates and social type of cooperatives), which took over marketing of the products. So, the new type of socialistic co-operative was

formed, with their own production, and teams of expert extension service. This is important, because the extension workers covered first of all their own needs, but soon they started to give advices also to the co-operative farmers. Such cooperation increased the production. As already mentioned, co-operatives organized the market for the entire agricultural production. The law on co-operative work in 1972 insured co-operative relationships and the way of production, which introduced a farmer as a client. In this law it was clearly written, the co-operative can employ an expert (agricultural extension service) to give the farmer advice in production problems. These experts were paid with the money from the sold repro material to farmers and sold agricultural products. Because of that law, the co-operative union started working again and in 1975 the union established the **Centre to promote agriculture.** This centre joined agricultural advisers in co-operative teams. Experts in the Centre were financed from state budget. In February 1982 the important **Law on food production** was accepted. That law provided 10 % co-financing of 190 co-operative advisers, and 40 % co-financing of 30 experts -specialists in district institutions. In 1973 the Animal Production and Business Association, founded by cooperatives, combinates and food processing industry gave other funds to pay the specialists. The Association collected funds for its operation, to run its professional activities and control service, special applied research work and for co-financing the extension service, which had as many as 450 advisers in 1986. They were 1/3 financed by the state, 1/3 from the co-operative funds, and 1/3 by the communities. The advisers worked at co-operatives and their work was closely connected with the work of specialists at district institutions. They covered all the needs in the field of agriculture. Because of the fact, that the Slovene farmers still get 40% of their income from cattle production, we can understand, that their work was orientated to advising also on feed production, and improved milk and beef production.

In 1990 great changes took place. Animal Production and Business Association stopped operating, after that the state of Yugoslavia fell apart, and in 1991 Slovenia became independent. There was a possibility, that the organized extension service would end, as well as its work and that would be a major damage for the Slovene economy. To avoid this, the minister of agriculture moved the extension service under the frame of the Ministry of agriculture, forestry and food in 1990. Two years later milk recording and selection services were given into the hands of the ministry. The number of advisors decreased to 300. Because of the Law on Agriculture and Forestry Chamber in 1999, the extension service could become the chamber's responsibility. It happened in October, 2000. The chamber provided financial

means, so the extension service was co-funded up to 70 %. Today, 323 advisors are working in eight district institutions which are part of Agriculture and Forestry Chamber. 92 extension workers are specialists and 18 of them are responsible for cattle production.

Agriculture and Forestry Chamber also took over milk recording and selection services and got 80 % financial support from the state budget. 259 recording persons are responsible for milk recording and selection services, 27 of them work in the republic institutions. Until recently, the extension service, which was created to help farmers, has been supported by the state and other institutions. Farmers have always regarded extension services as state services and in most cases their attitude has not changed. Somehow they feel, that it is the duty of the state to help them with advisors. Most probably this philosophy is the seed of the past, which will not be easy to stop. Most farmers do not even think about trying to organize and take professional and material responsibility for their own decisions. The change in their attitude can not be expected from the people who have farming just as a supplemental activity, but we can expect a different attitude from the professional, full-time farmers, whose only income comes from the agricultural activities. The same way of thinking is apparent, when we talk about financing the recording service, herd book and selection. However, we can expect, that the professional farms, which will be created by the improved structural changes in agriculture, will soon realize the beneficial meaning of this extension service and will be prepared to pay for it.

Milk production improvement

The quantity of increase milk production is closely connected with the number of cows in the state, the number of dairy cows, and milk yield of dairy cows. For some decades, the artificial insemination has been widely spread. Over 90 % cows are inseminated. From the number of inseminations in consecutive years, we can see the movements in the number of cows in the country. The information in Table 1 can confirm, that from 1985 to 1990 the number of cows mostly decreased (over 10 %). The downfall in the last 12 years came only to 6 %. The decrease is even lower if we consider natural mating in suckler cow production on the pasture. In the last decades, the number of dairy cows included in milk recording has risen (Table 2). On farms, which were until 1991 state owned estates, the number of cows has been falling, but on the other hand, the number of cows on family farms has increased. Leading dairy farms

and professional farmers value the information provided by milk recording services more and more, because milk recording results help them in selection and farm management. Fanners gain knowledge from the experts on selection and extension service, through different forms of permanent education, and from the media. Farmers, who realised the benefits wish to be included in milk recording process. Because of this, the number of recorded cows is rising every year.

Table 1. - CHANGING NUMBER OF INSEMINATIONS

Year	L*	B	BW	CH	LM	BPBG	RC	Together
1976	109,629	71,092	11,695	1,334	5,762	-	1,095	200,607
1980	113,077	63,198	16,097	8,191	5,518	-	419	206,968
1985	126,521	73,505	20,103	4,700	2,164	-	160	227,162
1990	116,642	56,262	22,672	3,955	3,481	-	42	203,054
1995	119,260	45,079	25,468	4,650	5,784	123	170	200,534
2000	113,827	29,338	33,257	2,689	11,564	6,432	359	197,484
2001	112,161	27,682	35,410	2,638	12,727	7,275	417	198,300
2002	107,764	24,849	36,409	2,493	12,703	7,663	465	192,346

*L - Simmental breed, B - Brown breed, BW - Holstein-Friesian breed, CH - Charolais breed, LM - Limousin breed, BPBG - Belgian blue breed, RC - Red Cika Breed

Table 2. - THE NUMBER OF COWS INCLUDED IN MILK RECEDING PER LOCATION

Year	Fanning enterprises	Family farms			Total
The type of milk receding method	A	A	AP	B	
1959/60	-	-	-	-	10,478
1966	14,238	7,251	-	-	21,489
1972	10,393	11,232	-	14,086	35,731
1980	9,993	27,764	-	26,870	64,627
1985	9,747	48,347	800	-	58,894
1990	8,061	46,324	3,739	-	58,124
1995	6,808	53,035	6,369	-	66,212
2000	5,421	26,283	39,426	-	71,130
2002	4,812	13,837	55,351	-	74,000

After the year 1990, milk yield of milk recorded cows increased very rapidly (Table 3). The average milk yield of recorded cows increased 122 kg/year. Milk fat also increased 0.44 % and protein contents up to 0.26 %. The highest progress was observed in milk production of Black and White cows, more than 1,400 kg. The least progress was observed in milk yield of dual-purpose cows, not more than 1,170 kg (Table 4). However, the value of milk fat in dual-purpose cows increase for over 0.5 %.

Table 3. - AVERAGE MILK YIELD IN STANDARD LACTATION OF RECORDED COWS FROM 1980 - 2002

Year	No. of rec. herds	No. of rec. cows	No. of finished lact.	Production in 305 days		
				Milk, kg	Fat, %	Proteins,%
1980		37,757	32,418	3,982	3.76	-
1985		58,894	55,873	3,596	3.73	-
1990		58,124	50,994	4,092	3.74	-
1993		63,316	53,290	4,136	3.84	3.08
1995	7,828	62,560	55,450	4,505	3.94	3.19
1997	7,385	70,516	64,701	4,615	4.06	3.24
2000	6,227	67,838	55,603	5,240	4.12	3.34
2001	6,127	69,535	57,589	5,452	4.14	3.34
2002	6,127	74,000	64,999	5,561	4.18	3.34

Because the number and the share of cows, included in market milk production is falling (Table 5), the rate of recorded cows increased to 65 % (comparison of data in Tables 2 and 5). The desire to include new breeds in production is still present among breeders. This proves, they know about the benefit brought by the production recording. Structural changes in the last 12 years (Tables 5 and 6) are very pleasing. The number of farms included in selling milk fell for over 2/3, but the quantity of sold milk to dairies increased over 30 %. This situation is possible because of the high increase in milk yield of cows. The quantity of sold milk per cow has almost doubled, it was over 4,159 kg and over 38,000 kg per farm in the year 2002. The average number of cows per farm has almost tripled, from 3.5 up to 9.3 cows per farm. The number of farms, with just a few cows has reduced. The so called half-farms, which get their income also outside the agricultural activities will stop milk production, as soon as their income from other than agriculture activities will insure them a stable standard.

Table 4. - AVERAGE MILK YIELD OF RECORDED COWS ON FARMS IN DIFFERENT YEARS AND BREEDS IN STANDARD LACTATION

Year	Simmental breed				Brown breed				Black/White breed			
	No. of cows	Milk kg	Fat %	Prot %	No. of cows	Milk kg	Fat %	Prot.%	No. of cows	Milk kg	Fat %	Prot %
1970	3,857	3,563	3.79	-	7,000	3,386	3.78	-	3,017	4,010	3.79	-
1975	5,151	3,372	3.75	-	7,180	3,513	3.76	-	4,825	4,359	3.69	-
1980	13,968	3,668	3.81	-	9,880	3,744	3.73	-	7,560	4,862	3.73	-
1985	26,539	3,185	3.77	-	16,753	3,513	3.71	-	10,768	4,705	3.65	-
1990	23,674	3,518	3.74	-	14,285	3,902	3.80	-	11,623	5,489	3.66	-
1993	26,239	3,522	3.85	3.18	13,799	4,043	3.89	3.10	12,306	5,543	3.79	3.01
1995	26,092	3,837	3.94	3.24	14,037	4,288	3.98	3.19	14,358	5,930	3.92	3.14
1997	30,327	3,951	4.06	3.26	16,872	4,446	4.08	3.25	16,395	6,019	4.04	3.20
2000	24,327	4,405	4.17	3.38	13,001	4,979	4.15	3.36	17,164	6,633	4.05	3.28
2001	24,747	4,588	4.22	3.39	13,109	5,118	4.16	3.38	18,484	6,860	4.07	3.28
2002	27,168	4,689	4.26	3.39	14,322	5,161	4.19	3.37	21,970	6,914	4.11	3.28

Table 5. - THE NUMBER OF HERDS AND COWS INCLUDED IN MILK PURCHASE AND THE QUANTITY OF SOLD MILK

Year	Number of herds	Number of cows	Sold milk in litres to dairy industry			Milk content, %	
			Milk, (total)	Per cow	Per herds	Fat	Protein
1980	55,533	150,694	303,831,000	2,016	5,471		
1985	58,194	175,696	352,454,200	2,120	6,063		
1990	43,656	161,992	359,184,200	2,217	8,228	3.74	-
1993	36,327	148,802	346,095,000	2,326	9,527	3.78	-
1995	30,040	132,532	388,394,400	2,968	12,942	3.92	3.24
1998	21,373	122,749	420,127,700	3,269	19,657	4.08	3.33
2000	16,869	117,775	447,831,000	3,758	26,516	4.10	3.36
2001	13.360	116,000	460,562,960	3,970	34,473	4.12	3.34
2002	12.274	114.000	473.500,000	4,154	38,577	4.13	3.33

Data from Statistical Gazette (1980,1985,1990, 1993,1996, 2000, 2001,2002) and Internal Reports GIZ - Animal Production Business Association of Slovenia (1985, 1990,1993,1995, 1998,2000,2001,2002).

Table 6. - STRUCTURE OF HERDS AND THE NUMBER OF COWS IN HERDS ON FAMILY FARMS, INCLUDED TO MILK PURCHASE

Year	Farms and number of cows/farm, %				No. farms	No. cows/farm
	1-4 cows	5-9 cows	10-15 cows	Over 15		
1981	78,2	19,2	2,1	0,4	52.221	2,78
1985	78,6	18,0	2,7	0,7	58.130	2,86
1990	73,5	21,3	3,6	1,6	43.613	3,53
1992	71,8	22,0	4,6	1,6	38.154	3,92
1995	62,0	28,6	6,7	2,6	30.012	4,36
1997	58,5	28,1	9,4	4,0	25.063	4,90
2000	46,9	30,0	13,7	8,9	16.847	6,79
2001	41	32	17	10	13.360	8,68
2002	36	34	18	12	12.274	9,29

Very important is the fact, that in the last few years breeders greatly improved also the microbiological and hygienic quality of milk (Tables 7 and 8). In the year 2002 only 2-3 % of sold milk did not suit the European requirements. Less than 8 % of sold milk had over 400,000 somatic cells. The improvement was achieved due to the penalties and rewards policy, imposed by the state (Ministry of Agriculture, Forestry and Food) in 1993. Better milk quality was reworded, and v.v. Such policy was possible in times, when the state dictated milk prices. But for sure, breeders will need to do hard work to improve milk quality and to keep it on the high level through the year. In some summer months, the quality is a bit lower (Picture 1). Milk quality and content are getting more and more important and in the near future, the composition and structure of milk proteins will play a major role.

Table 7. - MICROBIOLOGICAL QUALITY OF SOLD MILK TO DAIRIES

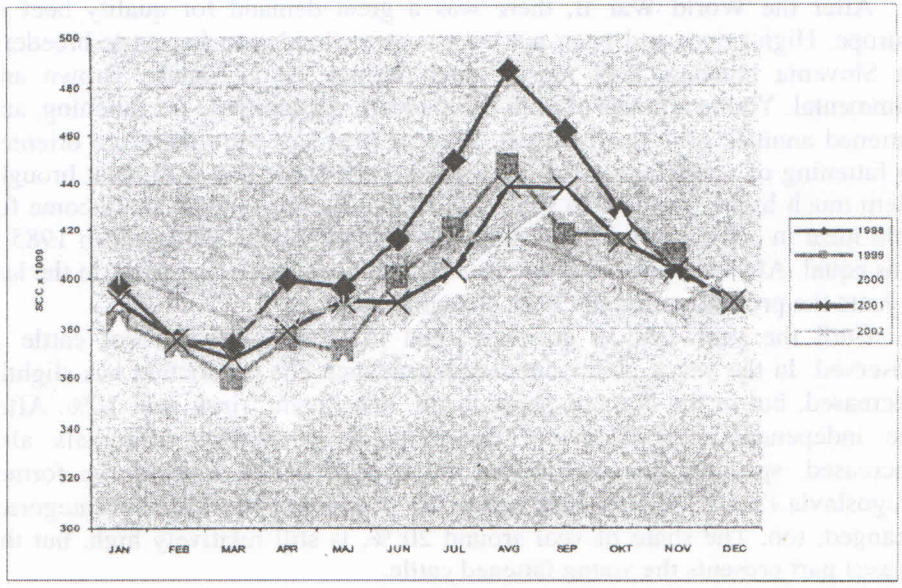
Year	Sold milk in different quality-classes, % (No. of microorganisms in ml)		
	Up to 400,000	Up to 100,000	Up to 50,000
1994	87.2	60.40	43.50
1995	93.0	78.60	61.49
1996	93.7	75.70	63.31
1997	94.7	82.82	68.33
1998	95.7	84.10	69.21
1999	96.9	85.88	69.86
2000	97.9	95.16	85.71
2001	99.1	96.74	90.55
2002	99.4	97.35	91.21

Table 8. - SOMATIC CELL COUNT IN SOLD MILK

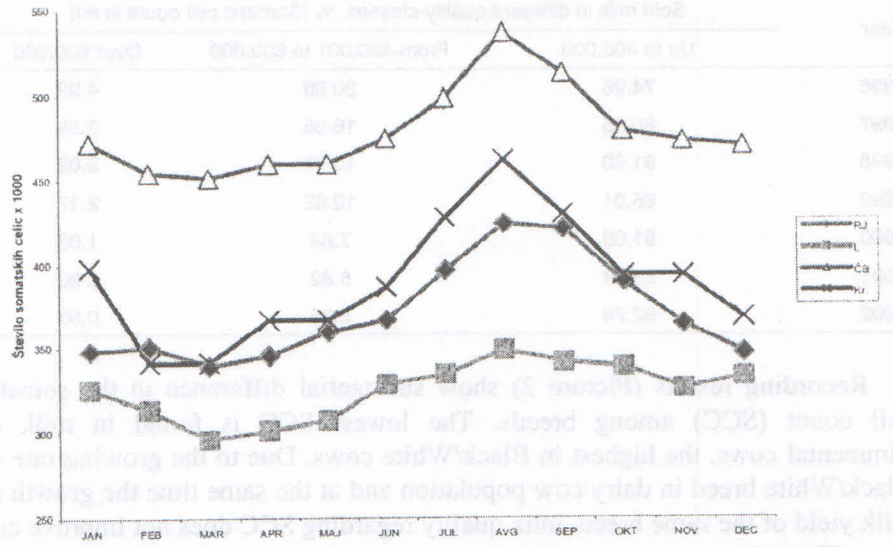
Year	Sold milk in different quality-classes, % (Somatic cell count in ml)		
	Up to 400,000	From 400,001 to 600,000	Over 600,000
1996	74.96	20.06	4.98
1997	80.35	16.06	3.59
1998	81.90	15.01	3.09
1999	85.01	12.82	2.17
2000	91.08	7.84	1.08
2001	93.38	5.82	0.80
2002	92.76	6.36	0.88

Recording results (Picture 2) show substantial difference in the somatic cell count (SCC) among breeds. The lowest SCC is found in milk of Simmental cows, the highest in Black/White cows. Due to the growing rate of Black/White breed in dairy cow population and at the same time the growth of milk yield of the same breed, milk quality regarding SCC does not improve any more (Table 8).

Picture 1. - AVERAGE SOMATIC CELL COUNT - MILK RECORDING RESULTS



Picture 2. - AVERAGE SOMATIC CELL COUNT PER RECORDING MONTH AND PER BREED



Improvement in beef and veal production

After the World War II, there was a great demand for quality beef in Europe. High prices and open market meant a stimulation for cattle breeders. In Slovenia breeders kept mostly dual purpose cattle breeds, Brown and Simmental. Young animals of both breeds were very suitable for fattening, and fattened annuals gave quality meat. Slovene breeders were therefore oriented to fattening of young cattle for the market. Data show that sold meat brought them much higher profit than sold milk (Table 9). Up to 1985 the income for sold meat in comparison to sold milk was gradually decreasing and in 1985 it was equal. After the year 1985 the income from sold milk increased. In the last 5 years the proportion has not been changing much.

Until the year 1985 a growing trend in the number of beef cattle is observed. In the years of Slovenian independence, the production has slightly decreased, but in the last few years it has, once again, risen over 10%. After the independence of Slovenia, the purchase of slaughter animals also decreased, specially because it was rather high in the time of the former Yugoslavia (Table 10). In these years, the proportion of slaughter categories changed, too. The share of veal around 20 %, is still relatively high, but the largest part presents the young fattened cattle.

Table 9. - CHANGING THE VALUE OF PURCHASED CATTLE AND MILK IN MILLIONS DIN UP TO 1991 AND MILLIONS SIT AFTER 1991

Year	Animals (slaughter of cattle and calves)	Milk and dairy production	Proportion (meat : milk)
1902	8,3 mio K*	1,1 mio K	7,5:1
1956	4,8	1,4	3,4:1
1960	76,7	25,6	3,0: 1
1965	330,6	78,5	4,2:1
1970	414	144	2,9:1
1975	1.009	599	1,7:1
1980	2.408	1.972	1,2:1
1985	14.578	14.305	1 :1
1990	764	1.256	1:1,6
1995	8.703	15.446	1:1,8
1998	11.133	22.450	1:2,0
1999	11.329	23.983	1:2,1
2000	10.932	26.047	1:2,4
2001	11.910	27.050	1:2,3

Source: Statistical yearbook of Slovenia; *-in crowns

Table 10. - CATTLE FATTENED AND SLAUGHTERED IN SLAUGHTER HOUSES IN SLOVENIA

Year	Number in 1000		Carcass weight in 1000 tons	Estimation of body weight in 1000 tons
	Slovene only	Total slaughter	Slovene only	In Slovenia
1955	173	173	19	38
1960	159	159	18	56
1965	187	187	32	75
1970	138	180	26	60
1975	181	221	37	79
1980	136	152	36	85
1985	144	177	39	86
1990	147	172	39	88
1995	111	120	33	88
1996	121	124	34	88
1997	123	125	34	79
1998	123	125	34	81
1999	127	129	34	85
2000	126	130	34	91
2001	140	143	41	94.
2002	154	157	43	98

Source: Statistical yearbook of Slovenia and calculations based on the information in a yearbook

Lately, this rate has fallen due to the increased number of cows (Table 11), especially Black/White cows, which are very popular by milk producers. Black/White cows stay in production for a shorter period, and breeders have to replace a larger percentage every year.

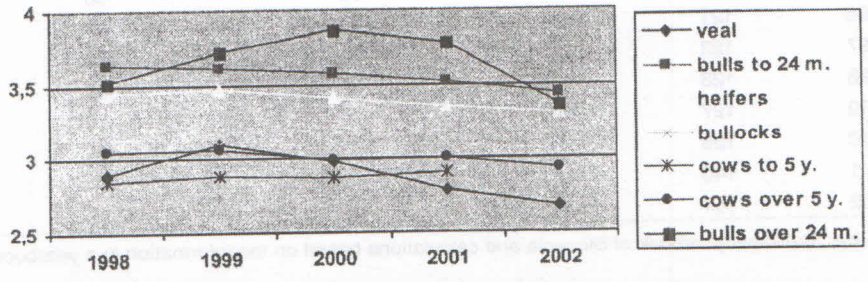
Table 11. - STRUCTURE OF SLAUGHTER IN SLOVENE SLAUGHTER-HOUSES (IN 1000S)

Year	Calves		Bulls	Cows		Oxen	Young cattle	
	Number	%	Number	Number	%	Number	Number	%
1953	93	58	4	29	18	16	18	11
1955	110	64	4	29	17	16	13	7
1960	69	43	19	31	19	19	20	13
1965	57	30	35	26	14	12	57	30
1970	59	33	21	28	16	13	59	33
1975	69	30	31	19	9	5	97	45
1980	19	12	-	20	13	1	112	73
1985	14	8	-	20*	11	-	143	81
1990	13	7	-	19	11	-	142	82
1995	14	12	-	15	13	-	90	75
1996	19	15	-	17	14	- -	88	71
1997	21	17	-	16	13	-	88	70
1998	25	20	-	17	14	-	83	66
1999	29	22	-	16	13	-	84	65
2000	29	22	-	20	16	-	79	62
2001	24	17	-	30	21	-	87	62
2002	28	18		36	23		92	59

* after the year 1985 the older bulls and oxen are marked in category of cows

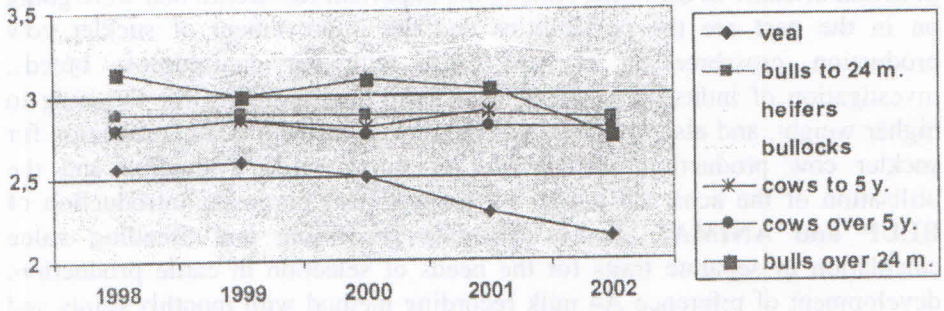
Source: Statistical yearbook of Slovenia and calculations based on the information in a yearbook

Picture 3. - AVERAGE SCORE OF CARCASS CONFORMATION FOR DIFFERENT CATEGORIES (E=5, U=4, R=3, O=2, P=I)



Recently, changed breed structure (Table 1) and changed types of Simmental and Brown breed have also brought the change in carcass quality of slaughtered cattle (Picture 3 and 4). Carcass conformation is lower, as well as fatness of some slaughtered cattle categories. Pictures 3 and 4 are made on the base of data gathered in bigger slaughterhouses referring to 60 % of slaughtered cattle last year, so data can be considered as fairly reliable.

Picture 4. - AVERAGE SCORE OF CARCASS FATNESS FOR DIFFERENT CATEGORIES



Applied research work and professional services

Increased milk and meat production, and their quality after the year 1991 is a consequence of many factors. The progress is certainly due to the professional services, especially the selection and extension services. The quality work of these services is beside upon good organisation, and the way these services are provided with new knowledge, which they have to forward to their customers, the farmers. The organisation was, in time of transition, when there was danger that these services will disappear like in other CEEC countries, provided by the minister of agriculture. Till the foundation of Agriculture and Forestry Chamber, he transferred their organisation and activity under the frame of the Ministry for Agriculture, Forestry and Food (MKGP). Experts and researchers required knowledge and it was provided by the Agricultural Institute of Slovenia (KIS), district agricultural units, secondary schools, Faculty of Agriculture Maribor, and in the last two decades particularly by the Biotechnical Faculty, Zootechnical Department. Along the financial support Ministry for Agriculture, Forestry and Food (MKGP) dedicated most of the time to the applied developmental researches and to the

organization of different forms of permanent education. The whole time farmers were advised by experts, their knowledge was based on home research results that have also considered special Slovene cattle breeding conditions. Especially important was the research work and pedagogical work at the Biotechnical Faculty, Zootechnical Department. They had a special task to investigate how to increase production, to investigate supplementary methods in data processing, and the supplementary breeding value calculations. The results of these researches provide the base for the improvement of breeding and production programmes, which promote better ways of using production potential of cattle in Slovenia. Among the important researches that were going on in the past are the possibilities and the improvement of suckler cow production, crossbreeding of beef cattle with our dual-purpose breeds, investigation of industrial crossing to acquire quality calves for fattening to higher weight, and also to investigate the most suitable breed combination for suckler cow production, introduction of linear cattle evaluation and the utilisation of the achieved results for management purposes, introduction of **BLUP and ANIMAL** models for data processing and breeding value calculation of separate traits for the needs of selection in cattle production; development of reference A4 milk recording method with monthly prints and including new milk traits to the receding process. The results of all these researches are available for demonstration experiments, where professional service workers are involved, as they are involved in other kinds of permanent education. Advisors are qualified to put new knowledge into farming practice.

Introduction of new programmes

Certainly, the application of modem methods in milk recording and the activity of advisors is never concluded. That is why the experts at the Biotechnical Faculty, Zootechnical Department are developing new milk recording programmes and the programmes for the needs of extension services in cattle production, to offer help in the restructuring processes, and to supplement the existing programmes.

Momentarily, the most urgent question is cheaper milk recording, which would increase the number of information for breeders, but reduce milk recording costs at the same time. The possibility to change from reference method A4 to method AT4 was thoroughly investigated. For Slovene circumstances correctional factors were calculated by modern computers for the calculation of standard lactation, that will in spite of cheaper recording stay

equally reliable as before. At the beginning of the year 2004 we will start with the introduction of AT milk recording method as everyday practice.

Monitoring of the increased beef and veal quality (Picture 3 and 4) has shown, that higher rate of Black/White breeds and the changed combining of Brown type, partly also Simmental type, worsened the quality of slaughtered cattle. Breeders are trying to overcome this worsening by industrial crossing with beef breeds (Table 1). The efficiency of industrial crossing also depends upon the decision which beef breed to choose for crossbreeding. Now, extensive experiments are in progress, investigating crossbreeding with Charolais, Limousin, Blond'Acquiten and White/Blue Belgian breed. We expect to establish the most suitable crossing combination for Slovene conditions to improve the quality of fattened cattle once again.

Customers demand beef and veal from different sustainable forms of cattle production. That is why veal production in the form of suckler cow production is intensely examined. In Slovenia there is a variety of conditions for suckler cow production, therefore it is not possible to recommend only one breed or one type of cows for this intention. We hope that experts from the Zootechnical Department at the Biotechnical Faculty will give answers to this question, and advise which suckler cow breed should be most suitably used in different environmental conditions. This project is extremely important, namely because it is estimated, that Slovene breeders are already rearing more than 1/3 cows as suckler cows. For this kind of production the farmers get financial state premium. The share of suckler cows will as yet rise with structural changes.

Because Slovenia is too small to have a separate institution just for the applied researches, we organized this kind of research work at the Biotechnical Faculty, Zootechnical Department decades ago as university graduate and postgraduate studies for the needs of cattle production. Thus, students get acquainted with the research problems during the course of their study. So after graduation they work as advisors or experts in recording and selection services. They are best qualified to take part in developmental applied researches, in the transfer of new accomplishments to farmers, and to participate in different forms of permanent education, which are also organized mainly by the already mentioned institution.

Conclusion

Better milk yield, higher milk quality, changes in beef production, as well as great structural changes in the last decade are mainly the consequence of

numerous factors. In comparison with the changes in other CEEC countries, also some EU countries like Austria, Greece, Portugal, we can be proud of the achieved results. It is true that the Slovene cattle breeders are gradually more educated and respect new knowledge, but without the efficient work and cooperation with advisors, recording persons, and experts at the educational-developmental institutions, the success could not have been achieved. The results clearly indicate that the extension services have improved their organisation, and because they were not cancelled in the time of transition, as happened in other CEEC countries, the positive situation in Slovenia developed. The organisation and function was always adapted to Slovene conditions and needs. However, specialised dairy farms have to intensify and devote their efforts to the elimination of deficiencies in farm management, especially after the introduction of milk quotas. We are sure they will see and feel the solution for their problems in adequately qualified extension workers. Therefore the educational and research institutions in Slovenia are faced with an important task - to educate specialists, which will be capable to help the farmers. Here, foreign experiences will be respected, yet adapted to specific cattle production conditions in Slovenia.

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SAVJETODAVNI RAD U PROIZVODNJI MLIJEKA I GOVEDINE U SLOVENIJI

Sažetak

U zemljama CEE-a primijećen je trend smanjenja proizvodnje mlijeka i govedine nakon 1990. g. U Sloveniji isporuke mlijeka povećale su se za 30% dok je proizvodnja teletine i govedine ostala na istoj razini kao 1990. Prinos mlijeka praćenih krava porasao je od 4.131 kg u 1990. na 5.561 kg u 2002., a postotak praćenih krava od 33 na 61% svila muznih krava. Mikrobiološka i higijenska kakvoća mlijeka znatno se poboljšala. Godine 1994. samo 60% kupljenog mlijeka imalo je manje od 100000 m.o./ml, a 2002. 97%. U istom razdoblju postotak mlijeka s manje od 400000 SCC/ml porastao je od 75 na 93%. Poboljšanja su većinom rezultat djelotvornog savjetodavnog rada te potpore Zootehničkog odjela Biotehničkog fakulteta. Do 1990. godine savjetodavni rad provodio se putem gospodarskih zadruga uz djelomično financiranje od države. Nakon što je Slovenija postala nezavisna savjetodavni rad je postao dio Ministarstva poljoprivrede i financira se iz državnog budžeta. Od 2002. savjetodavni rad kao i mjerenje mlijeka i uzgoj životinja pod odgovornošću su Poljoprivredne i šumarske komore. Vlada financira većinu tih aktivnosti. Te su promjene osigurale nastavak uspješnog savjetodavnog rada. Nedavno je predložena promjena metode A4 na izmjeničnu (AT) metodu mjerenja. Što se tiče kakvoće u tijeku je nastavak aktivnosti za poboljšanje istraživanja, te obrazovnog i savjetodavnog rada.

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