Breeder associations, milk recording and identification of cattle and sheep in Slovenia

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Geographic position

The Republic of Slovenia is one of the youngest countries in Europe. As a distinctively transit Central-European county, it is located at an important traffic crossing from the Alps to the Balkan region, i.e. from the Danube river region to the Mediterranean Sea.

Table 1. Basic data.

Territory	20 256 km
Geographical macroregions	Alpine (12 percent of territory), Sub-alpine (31 percent), Sub-pannonian (23 percent), Dinaric-Karst (26 percent), Sub-Mediterranean (8 percent)
Inhabitants (1998)	1 982 603
Population density	97.9 inhabitants / km²
Rural population	57.3

Current situation in agriculture

In recent years, agriculture has contributed less than 4 percent to the GDP and has employed around 6 percent of the active labour force in Slovenia. As an important social and political factor in rural areas, agriculture is of greater national importance than indicated by more macroeconomic indicators.

The Republic of Slovenia remains a net importer of agri-food products. Exports only cover about 45 percent of the imports. The Republic of Slovenia has low self-sufficiency levels which are especially apparent in oil, cereals, sugar and pigmeat. There is a constant surplus in hops, poultry and milk production. Exports are also important in certain processed products (quality beef and meat products, quality wine and beer). Slovenian

Table 2. Main macroeconomic indicators and importance of agriculture in the Slovenian economy.

		1990	1993	1997	1998	1999
GDP per capita	US$	8 823	6 366	9 163	9 847	9 970
GDP	% change	-4.7	2.8	4.6	3.9	3.8
Inflation	% change	549.7	32.3	9.1	7.9	6.1
Unemployment	% labour force	4.7	15.4	14.8	14.6	13.0
Share of agriculture:		1993	1995	1996	1997	1998
in employment	%	7.5	6.4	5.8	5.6	5.6
in GDP	%	4.1	4.0	3.9	3.7	3.6

agriculture and the food processing industry are well connected to international trade channels. The most important export markets are those states which have emerged from the former Social Federal Republic of Yugoslavia (SFRY) (Croatia, Former Yugoslav Republic of Macedonia (FYROM) and Bosnia and Herzegovina). Most imported goods originate from the European Union's common market.

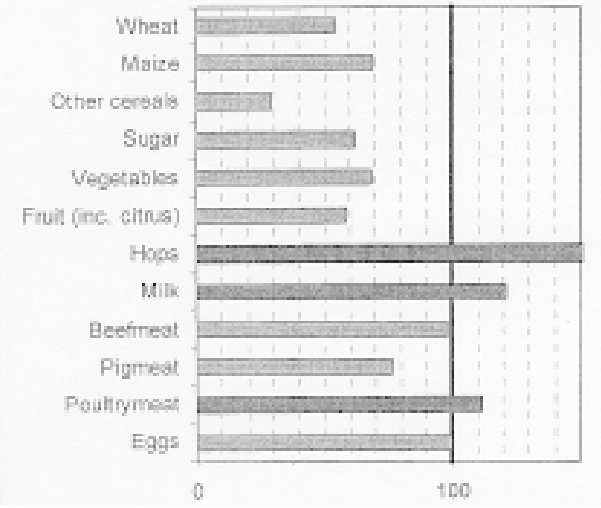

Figure 1. Self-sufficiency levels for the most important agricultural commodities.

The natural conditions for agricultural production are relatively unfavourable in the Republic of Slovenia. Slovenia is highly forested, the share of agricultural land in the total surface area is low and the terrain configuration is unfavourable, resulting in a large share of agricultural land designated as less favoured areas. Slovenia has a high share of permanent pastures and a low share of arable areas in the structure of agricultural land use. The Republic of Slovenia classifies over 70 percent

of its agricultural areas under less favoured areas for agricultural production. The natural conditions implicate a lower production capacity and costlier production.

The natural conditions and the structural shortcomings reduce the competitiveness of Slovenian agriculture compared to European agriculture.

Slovenian agriculture was developing in a specific political and economic environment in the post-war period, a fact reflected also by its farm structure. Two very different forms of agricultural production developed: social (a kind of collective) farming on large holdings and private farming on small family farms. While the European Union was undergoing intensive structural changes (increase in farm size, specialisation, intensification), Former Yugoslavia mainly favoured social-collective farming, whereas the development of private farming was discriminated against through various measures. Thus, the development of the Republic of Slovenia's private farming, which cultivates over 90 percent of

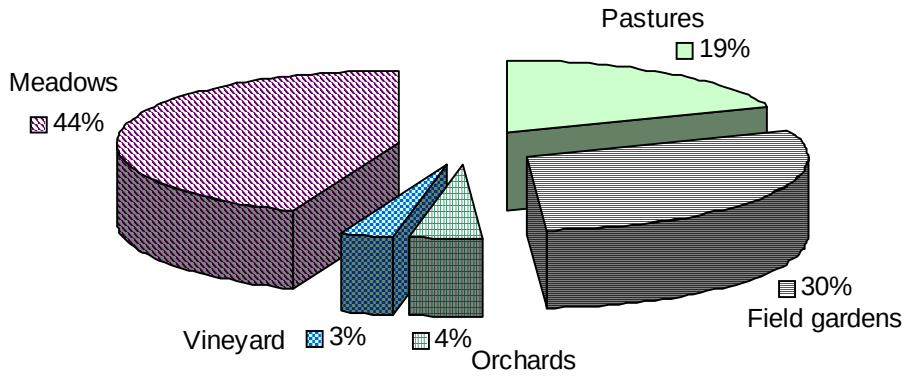

Figure 2. Structure of utilised agriculture area (UAA).

Table 3. Number of farms and total area owned by farm type and area farmed in 1997.

	Total		Full time		Part time		Supplementary		Aged	
Size (ha)	No	ha	No	ha	No	ha	No	ha	No	ha
Total	90 459	854 164	13 844	182 515	25 276	258 113	41 645	337 661	9 695	75 875
<1	8 141	34 042	154	445	842	5 041	5 239	20 510	1 907	8 046
1.01-2	16 585	62 634	1 341	4 831	2 975	11 152	9 528	34 576	2 742	12 076
2.01-3	14 038	76 443	1 377	6 388	3 450	17 503	7 646	42 585	1 565	9 968
3.01-4	11 606	82 955	1 468	10 575	3 620	24 418	5 497	39 435	1 022	8 527
4.01-5	8 645	81 528	1 181	10 880	3 146	29 485	3 585	35 200	733	5 964
5.01-10	22 762	307 707	4 989	72 031	8 018	101 063	8 328	112 860	1 427	21 752
10.01-20	7 756	175 450	2 890	62 910	2 951	61 829	1 655	42 995	259	7 716
>20	927	33 407	444	14 456	275	7 624	167	9 501	41	1 826

agricultural land, started lagging behind the agricultural development in previously comparable Central European countries. An unfavourable farm structure is reflected by the average holding size (5 ha of agricultural land per holding) and by the fact that over 85 percent of agricultural land in the Republic of Slovenia is cultivated by farmers who cultivate less than 20 ha of agricultural land in total. The unfavourable size structure is also reflected by the lower productivity of production. Another consequence of the unfavourable farm structure is the low rate of professionalisation, i.e. a small share of full-time farms.

The scope of agricultural production has been more or less stagnating in recent years. The most important agricultural sector is animal husbandry, accounting for over two thirds of the value of the total agricultural production structure. Milk and meat production using dual purpose cattle accounts for the highest share. Also important is pig and poultry production. Sheep production has been on the rise in recent years. The scope and structure of crop production have been vastly subordinated to the needs of animal husbandry. The most common crop is maize (grain and silage), covering over 40 percent of all fields. Among industrial crops sugar beet production is the most widely spread, while hop production occupies a special place since it is traditionally an export commodity. Wine growing also has an important tradition in the Republic of Slovenia. The diversity of natural conditions allows for the production of various fruits, apples being the leading fruit species. The intensity of cultivation has been on the rise in recent years, although the average yield per hectare remains below European Union levels in most cases.

Table 4. Structure of agricultural output.

	1992	1994	1996	1998
Total Agricultural Output	100.0	100.0	100.0	100.0
Plant production	45.6	50.4	42.1	44.6
Arable crops	33.2	39.3	30.2	33.5
Cereals	7.8	8.7	8.7	8.8
Industrial plants	2.1	2.5	3.0	3.2
Vegetables	8.9	7.4	8.7	8.5
Fodder crops	4.9	7.1	1.6	3.9
Green forage crops	9.5	13.6	8.2	9.1
Fresh fruits	5.4	5.5	5.8	4.0
Grape	7.0	5.6	6.1	7.1
Animal production	54.4	49.6	57.9	55.4
Cattle and milk	28.0	27.0	32.7	30.5
Pigs	12.6	12.5	11.8	11.8
Sheep, milk and wool	0.0	0.2	0.4	0.6
Poultry and eggs	13.6	9.6	12.7	12.1
Honey	0.2-	0.3	0.3	0.3

Source: SORS

Table 5. Livestock number ('000 heads; at the end of the year).

	1961	1971	1981	1991	1992	1993	1994	1995	1996	1997	1998	1999
Horses	54	40	17	11	9	9	8	8	9	10*	10	10
Cattle	595	508	565	484	504	478	477	496	486	446	453	471
Pigs	517	445	544	529	602	592	571	592	552	578	592	558
Sheep	49	24	16	28	22	27	29	39	43	53*	72	73
Goats					12	9	10	11	9	21 *	17	151
Poultry	2 392	5 386	11 582	13 134	6 152	6 192	5 794	4 920	5 773	7 058	8 550	8 550

*at 01-06-1997

Despite many problems and market losses after Slovenian independence, the production level has not been dramatically reduced like in many other CEE countries during transition, the exception being only the poultry sector. Export of milk and poultry products has been mostly reoriented into OECD and EU countries.

Organization of the cattle breeding service of Slovenia

Cattle breeding in Slovenia is organized in the National Cattle Breeding Programme run by the Cattle Breeding Service of Slovenia (CBS). The CBS is an association of a number of organizations and functions as a public service financed by the Ministry of Agriculture, Forestry and Food.

The main responsibility of the CBS is to steer and manage the national programme. Its main tasks include: conducting milk recording, beef performance recording and registration of animals running the selection (testing and breeding value prediction), controlling the herd book and pedigree service (pedigree certificates), advising on various topics: reproduction, animal health, nutrition, farm economics, marketing, etc., developing new methods and applying them to practice.

The Cattle Breeding Service of Slovenia operates on three levels:
- Central service;
- Regional Agricultural Institutions, Insemination Centres and Test Stations
- Breeder Organizations

Central Service

Central Cattle Breeding Service form the following institutions:
- Biotechnical Faculty, Zootechnical Department, Domzale;
- Agricultural Institute of Slovenia, Ljubljana;
- Veterinary Faculty, Ljubljana;
- Agricultural Faculty, Maribor.

Following the CBS programme, the four institutions abide to their sub-programmes. The Central Service performs the following tasks:

- prepares breeding programmes;
- forms a central database;
- processes recording data;
- predicts breeding values;
- carries out the preselection of elite animals;
- coordinates work and represents the Service in the country and abroad;
- publishes various publications, annual reports and sire catalogues.

Regional agricultural institutions, insemination centres and test stations

Six regional agricultural institutions are located in Murska Sobota, Ptuj, Celje, Ljubljana, Kranj and Nova Gorica. Part of their programme takes part in the National Breeding Programmes and their responsibilities include:

- recording and milk sample analysis;
- data collection for breeding programmes (conformation scoring of animals, milking ability);
- selection of bull dams, mating plan of bull dams;
- progeny and performance testing cooperation with breeding associations and organizing the exhibitions.

Bull semen is produced in two insemination centres:

- Ptuj together with Murska Sobota for the Simmental breed;
- Preska near Ljubljana for Brown, Black and White and beef breeds;

Performance testing is organized on two locations:

- Nova Gorica for Brown, Black and White and beef breeds;
- Murska Sobota for the Simmental breed;

Progeny testing for growth and carcass traits is organized on test stations in:

- Rogoza for the Simmental breed;
- Logatec for the Brown breed.

Cattle breeder organizations

The main tasks of cattle breeder organizations are:

- participation in forming the prices, State reimbursements and stimulations;
- cooperation with the Cattle Breeding Service in forming the breeding goals and selection programmes;
- organization of the market for breeding animals together with regional agricultural institutions;
- organization of animal exhibitions together with regional agricultural institutions;
- feedback and control of activities of the Advisory Service.

Cattle breeder associations of Slovenia

In Slovenia exist the following breeder associations for:

- Simmental breed;
- Brown breed;
- Black and White breed; and
- Meat breeds and meat production.

Cattle breeding associations are the following:

- local; and
- district.

Breeders

- 69 000 cows in milk recording; number of breeders 6 400;
- 199 000 tagged and registered cows;
- 122 000 dairy cows;
- 78 000 suckler cows;
- 200 000 cows and pregnant heifers inseminated; number of breeders 60 000;
- 225 000 cows and pregnant heifers; number of breeders 64 000.

Cow milk recording

The first breeders' association that began with milk recording in Slovenia was founded in 1909. Since 1986 Slovenia has been a fully authorized member of ICAR and INTERBULL. In Slovenia milk recording is performed according to the A4 Method, once a month for all milkings on the control day. The allowed interval between two recordings is 22 to 37 days. Every year at least 11 recordings must be taken per herd. Lactation calculation is made according to the number 2 Method (Test Interval Method), approved by ICAR.

Table 6. Number and portions of milk recorded cows.

Year of recording	Total no. of cows	No. of dairy cows	No. of suckler cows	No. of milk recorded cows	Percent of milk recorded cows of dairy cows	Percent of milk recorded cows of all
1980	226 036	146 726	79 310	45 290	30.9	20.0
1990	220 266	161 992	58 274	58 124	35.9	26.4
1995	207 318	132 532	74 786	65 837	49.7	31.7
1997	204 969	128 245	76 724	66 180	51.6	32.3
1999	200 000	125 788	74 212	69 199	55 0	34.6

Table 7. Average milk production per cow in years 1991 to 1999 in standard lactation (305 days).

Breed	Year	No. of milk recorded cows	Milk kg	Fat kg	Protein kg	Fat	Protein
Simmental	1991	30 190	3 553	135.0	115.0	3.80	3.23
	1999	29 334	4 340	182.2	145.7	4.20	3.36
Brown	1991	18 393	4 011	153.0	129.0	3.80	3.21
	1999	16 002	4 840	200.7	160.8	4.15	3.32
Black and White	1991	13 359	5 555	205.0	173.0	3.69	3.12
	1999	19 072	6 495	261.8	211.7	4.03	3.26
All breeds	1991	63 554	4 131	156.0	130.0	3.77	3.16
	1997	65 635	5 100	210.3	168.9	4.12	3.31

Structural changes and specialisation after the introduction of EU Regulations for quality of milk are the reasons for the rapid increase of milk yield in recorded cows, as well as for better milk content.

Organization and financing of milk recording

The milk recording service in Slovenia is organized and financed by the Ministry of Agriculture, Forestry and Food. The Cattle Service of Slovenia consists of a central service (Agricultural Institute and Biotechnical Faculty) and six regional centres (Murska Sobota, Ptuj, Celje, Kranj, Ljubljana and Nova Gorica).

Six laboratories analyse milk and belong to six regional centres. Laboratories have MILKOSCANS (diverse capacity). Some laboratories have FOSOMATIC for somatic cell counts. The mentioned six laboratories and other laboratories that analyse milk for dairies are part of the network for milk sample exchange. The laboratory of the Institute for Dairying that is part of the Biotechnical Faculty, the Zootechnical Department (BF), is a referral laboratory. The laboratory of the BF Institute for Dairying is included in the international network for assessment of results because Slovenia is a member of the ICAR Reference Laboratory Network led by Mr Oliver Leray. Slovenia exchanges results with referral laboratories in Europe (Denmark, France and Germany). All laboratories in Slovenia are included in the national ring test and are calibrated with the referral laboratory of the Institute for Dairying.

Table 8 shows the average number of cows per milk recorded herd in each regional centre. Smaller herds are in the eastern part of Slovenia where milk production has been omitted due to pig production and in the western part of Slovenia (Primorska) where farming has been omitted owing to aggravated production conditions. Young people leave this mountain and carst region and only elders remain.

Table 8. Average number of cows per milk recorded herd referring to sector and controller in 1997.

	Cow: herd ratio			No. of all	Average no.
Regional centre	Family farms	Farm	Total	controllers	cows per control
Murska Sobota	5.6	-	5.6	29	355
Ptuj	7.8	113	8.0	48	256
Celje	11.4	149	11.9	44	272
Kranj	15.3	177	18.1	18	344
Ljubljana	8.3	371	10.0	66	282
Nova Gorica	6.2	195	7.3	32	199
Total	8.0	234	8.8	237	277

Milk recording is financed by the Government for the time being. In Slovenia about 240 controllers and about 20 senior controllers who are responsible for milk recording and selection, registration and identification and pedigree data keeping in our herds are employed.

The average cost of milk recording per cow equals 180 kg of milk per year. The expenses are paid by the Government. Breeders in the future would like to have other traits measured, like somatic cell count, contents of urea in milk, nutrition and economic data and other prints within milk recording services but they should pay a part of the costs. The Government will not be able to cover all milk recording costs in the future. Therefore, financial resources for milk recording and animal registration should be used rationally. Serious considerations have already been started in connection to the AT method, reduction of laboratories for determination of milk traits and quality of milk and restructuring of control services for milk recording and data processing.

Quality assurance and Slovene dairy laboratories

There are presently fifteen laboratories dealing with quality estimation in Slovenia. Six of them are from milk recording services of Slovenia, others from dairies. The national referral laboratory in charge of harmonisation of methods and procedures with national laboratories of other countries and members of international associations will be appointed.

The Laboratory of the Institute for Dairying at the Zootechnical Department of the Biotechnical Faculty is presently in charge of such activities. The laboratory organizes inter-laboratory comparative tests for precision control of results, obtained by instrumental methods and also prepares reference material. It is a member of INTERLAB and is involved in the international laboratory control of precision of milk and dairy product analyses, organized by MUVA, Kempten, Germany, CECALAIT, Poligny, France, as well as the BACTOSCAN MILKSTANDARD Service, Wangen, Germany. In this way the laboratory practically takes part in organizing the European network of dairy laboratories (Golc, 1998).

Milk recording by sheep

In Slovenia milk recording is performed according to the ICAR A4 method and is performed by the National Sheep and Goat Breeding Service (SGBS). At State level, the herd book, database, data input, lactation calculation and evaluation of other traits are performed by the SGBS at the Biotechnical Faculty, Zootechnical Department. The milk yield of sheep and goats is calculated on the basis of monthly recordings and milk analysis. About 15 percent of the dairy breed population of sheep and goats is included in milk recording in Slovenia.

Animal identification in Slovenia

Identification and tagging of individual animals has traditionally been inspired by and initiated to facilitate animal breeding. With the intensification of production and increased trade of live animals, animal health and safety of products for human consumption became an increasingly important issue and identification of animals in trade, a device to control spread of diseases and to facilitate hormone and residue control. Lastly, with the increasingly complex marketing of food products, animal identification is becoming an expedient in marketing of meat and meat products at all levels: the farmer to market his products via trade marks and the Government to control production and the market throughout the State.

Slovenia is a country seeking membership in the European Union. Accession negotiations between the European Union and Slovenia started in 1998 and Slovenia has since been intensively adapting legislation to meet EU standards. Animal identification (particularly cattle identification) is defined in great detail by European and accordingly, also Slovenian legislation.

Cattle identification

The population of cattle in Slovenia is 491 600 (SUBS, VI / 99) and is slightly increasing. The average herd size is small (8.9 animals), mainly due to a large number of very small herds. In 1999 46 percent of herds consisted of four animals or less and 25 percent consisted of one or two animals. Nevertheless, the size distribution is rapidly changing. The proportion of herds containing one or two animals dropped from 29.4 percent in 1988 to 24.7 in 1999 and the proportion of herds of 50 animals or more rose from 0.6 in to 0.9 percent.

Two systems for identification and movement tracing were established and ran in the past: the identification system implemented by the breeding service and the tracing system implemented by the veterinary authority. The breeding service system has traditionally tagged all cattle in the recording scheme. The animals received uniform lifetime identification within one to three months after birth. In the last years, eligibility for Government premiums for animals required the animals to be tagged and the breeding service has tagged the animals due for any premiums. *In 1999 an estimated 60 percent of animals was tagged by the breeding service*.

The veterinary system is aimed at recording animal movements. Every movement between locations has to be registered by law. In the old situation, if an untagged animal was to be moved, it was tagged before the transfer. All animal movements were recorded in a central database. The two systems were therefore complementary, but they maintained separate computerised central databases.

The Slovenian Regulation on cattle identification and registration, put into force in 1999, made provisions for the national cattle identification and tracing system as defined by the EU Regulation 820/97. The Service for Identification and Registration ("SIR"), a body at the Ministry of Agriculture, Forestry and Food, is responsible for fully implementing the Regulation in the years 2000-2002. Five employees of the service, with the assistance of the field zootechnicians and veterinarians have the task of transforming and upgrading two existing separate identification systems into a single, EEC 820/97 compliant system.

The system is designed to rely on cattle keepers, field veterinarians, field zootechnicians and SIR, the central service. The keeper, who is ultimately responsible for registering births and movements of animals, tags the animals and keeps the register of animals on the holding. If the keeper needs help he can call the field commissioner who assists the keepers with tagging, keeping required records, registration of births and movements and also enters the data into the central database.

Sheep and goat identification

Sheep and goat population, almost non-existent before 1990, is rapidly increasing. In 1999 there were 70 000 sheep and 15 000 goats in Slovenia, flock sizes averaging 25 for sheep and 15 for goats.

Individual tagging of all sheep and goats is not obligatory, as is the case in cattle. Sheep and goat identification is regulated by zootechnical regulations requiring breeding animals to be individually tagged and by veterinary regulations, requiring animals in trade to be tagged, either individually or as a group.

Similarly to cattle, two tagging systems are in operation in sheep and goats. The veterinary system controls the animals in trade by issuing health certificates before animals are moved to a different location. Untagged animals receive a single >>group tag<< which is recorded on the health certificate but is not physically attached to the animal.

Certain categories of animals must be individually identified. First, all animals in flocks in the recording scheme must be individually tagged. In these flocks, breeders do not have a choice to tag selected animals; all lambs and kids must be tagged within a few days after birth. Next, all flocks included in the gene conservation programme are obliged to tag all their animals. Eligibility for any type of State animal premiums requires the animals to be tagged and registered. Finally, damages due to wild animal attacks are reimbursed only for tagged and registered animals.

Conclusions

- In the period of transition, 1990-1999, Slovenia managed to maintain the number of cows and milk production and breeding and milk recording services on almost the same level as before the transition. Milk production has been increasing since 1993 and there are some milk surpluses.
- Market demands and new regulations on EU quality of milk introduced in 1993 caused the decrease of family farms and State farms with market production of milk by 50 percent.
- The composition of milk (fat and proteins) and especially microbiological quality has since 1993 obviously been improved and reached the EU level.
- Family farms that keep market production of milk have improved technologies, genetic potential of animals and productivity of cows and productivity of work.
- The number of cows per family farm with market milk production has been slowly increasing (on 6.1 cows / farm in year 1998).
- Amounts of purchased milk per cow increased on family farms by 1 050 litres and on State farms by about 730 litres in the period 1990 to 1998.
- The Government contributes to the above changes by financing extension services, milk recording and selection services and by price policy and subsidies.
- The problem is the lack of attractive loans for more rapid changes of farm size and modernisation of milk production and modernisation of laboratories.

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