

## Milk Production and Its Use in Korea

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### Introduction

The dairy farming in Korea started when Kyoungsook Choi working at Agriculture and Livestock Experiment Station imported three cows of Jersey breed in 1885. In 1937, Kyoungsook Milk Corporation Association (present Seoul Milk Cooperative) produced and sold the first market milk. Under Japanese occupation in 1944 4,000 tons of milk was produced from 2,600 cows on 184 dairy farms. The chaotic situation during 8.15 independence from Japan and Korean War brought dairy industry to an end.

After the Korean war only 289 cows remained. However, in 1962, the Korean government imported 1,085 cows according to the first dairy promotion plan. Thanks to the improved living standard following the economic development of three decades and the nation's dairy farming promoting policy, dairy industry in Korea has rapidly developed in a short time period. Consequently, as of 1996, more than 200 million tons of milk was produced from 550,000 cows and processed in 62 milk processing plants. But in the rapid process of development both dairy farmer and milk processing factories got big strikes owing to being suggested among domestic consumers health problems about produced milk such as nutrition effect debates of low temperature long time pasteurized milk, pus milk fluctuation and preservatives containing in milk. To meet demand dairy industry tries to change the processing system following the dairy farming improvement bill, which was set up to improve milk processing factories and management of dairy farms.

Agreement on UR in 1993 and WTO in 1994 has allowed milk and milk products to be imported with some exceptions and as a result, forced our dairy industry less profitable. Moreover, prices of feedstuffs in world grain markets are soaring. Dairy farming and milk processing industry in Korea face an important turning point. In recent years, processing methods (pasteurization and sterilization) have been at issue among consumers and milk processing firms and health conscious consumers turned away because of hygiene, i.e., number of bacteria, somatic cells etc.

All in all, our dairy industry has to be more competitive to survive in flow of foreign products in the future.

### Present Status

#### 1. The Number of Cows

The dairy farming in Korea moved with full speed after a 5-year economic development plan included the dairy farming promotion project in 1961. At the same time, the livestock products processing and marketing law, dairy farming promotion law and grassland law were established. To enhance dairy farming loans from international funds such as IBRD had been introduced until 1985. During a 23-year period, 113,000 cows were imported (Table 1) and raised in every corner of the country. The number of cows increased from 2,400 in 1962 to 23,000 in 1970 and to 552,000 in 1996.

The number of dairy farms also increased from 676 in 1962 to 43,000 in 1985. The number of farms gradually decreased to 21,000 in 1996, while the average number of cows per dairy farm increased from 9 in 1985 to 26 in 1996 (Table 2). This number of cows per farm is still much less than that developed countries, i.g., USA (48 per farm), Dutch (41) and Japan (42).

Table 1. Import of Dairy Cattle

Year	Head	Value (US \$ Thousand)	Domestic Fund	IBRD	IDA	loan from Canada	loan by Company	Etc.
1963	271	—	149	—	—	—	—	122
1964	905	—	834	—	—	—	—	71
1965	600	—	504	—	—	—	—	96

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Year	Head	Value (US \$ Thousand)	Domestic Fund	IBRD	IDA	loan from Canada	loan by Company	Etc.
1966	626	—	328	—	—	—	—	298
1967	306	199	—	—	—	—	—	306
1968	1,111	603	—	—	—	790	—	321
1969	3,191	1,433	2,245	—	—	732	—	214
1970	1,607	1,085	1,434	—	—	—	—	173
1971	1,755	1,335	1,438	—	—	—	—	317
1972	2,816	2,047	—	—	1,700	—	992	124
1973	4,563	3,870	2,134	—	1,774	—	536	119
1974	5,460	4,898	3,884	—	1,425	—	—	151
1975	777	835	72	—	74	—	543	88
1976	1,824	1,560	1,318	384	—	—	65	93
1977	12,150	12,760	7,983	3,381	—	—	552	234
1978	21,903	23,558	15,449	2,530	—	—	3,023	901
1979	16,214	20,730	11,970	—	—	—	3,587	657
1980	4,390	6,611	2,615	—	—	—	1,752	23
1981	—	—	—	—	—	—	—	—
1982	9,507	16,506	8,621	—	—	—	886	—
1983	10,579	18,619	10,579	—	—	—	—	—
1984	1,265	20,061	11,243	—	—	—	—	22
1985	1,239	2,694	1,239	—	—	—	—	—
Total	113,059	139,404	84,039	6,295	4,973	1,522	11,936	4,330

Source : 1996 Dairy Farming Yearbook by Chuksan Shinmoon

Table 2. The number of dairy cattle

Year	Household	Heads			Head/ Household
		Total	Female	Male	
1650	—	780	—	—	—
(6.25 later)					
1954	—	289	—	—	—
1962	676	2,406	1,956	450	3.6
1967	1,818	10,360	9,075	1,285	5.7
1968	2,145	13,760	11,834	1,926	6.4
1969	2,322	18,820	16,463	2,357	8.1
1970	3,126	23,624	20,510	3,114	7.6
1971	3,270	30,009	25,481	4,528	9.2
1972	3,788	36,128	30,295	5,833	9.5
1973	5,488	52,424	43,039	9,385	9.6
1974	7,378	73,195	59,203	13,992	9.9
1975	9,415	85,542	71,130	14,412	9.1
1976	10,174	89,688	82,753	6,935	8.8
1977	13,933	109,243	104,684	4,559	7.8
1978	16,387	135,803	129,980	5,823	8.3

Year	Household	Heads			Head/ Household
		Total	Female	Male	
1979	17,170	163,299	156,422	6,877	9.5
1980	17,666	179,841	172,883	6,958	10.2
1981	18,229	104,205	186,558	7,647	10.7
1982	22,536	228,248	221,888	6,360	10.1
1983	29,537	274,783	267,506	7,277	9.3
1984	37,646	334,352	326,592	7,760	8.9
1985	43,760	390,135	390,135	-	8.9
1986	42,728	437,333	437,333	-	10.2
1987	38,131	463,330	463,330	-	12.2
1988	35,713	480,239	480,239	-	13.4
1989	36,040	515,178	515,178	-	14.3
1990	33,277	503,947	503,947	-	15.1
1991	30,150	495,772	495,772	-	16.4
1992	27,965	508,241	508,241	-	18.2
1993	25,667	553,343	553,343	-	19.6
1994	23,958	552,139	552,139	-	21.5
1995	23,519	553,467	553,467	-	23.5
1996	21,129	551,493	551,493	-	26.1

Source : 1996 Dairy Farming Yearbook by Chuksan Shinmoon

## 2. Milk Production

The yearly milk production and yield per cow are shown in Table 3. Increase in milk production was due to both an increase in number of cows and yield per cow. Total production in 1996 was about 2,100,000 tons (about 0.4% of the world production) and an average yield per cow was 6,000kg. Compared to that in 1963, milk production increased 500 times and yield per cow 1.9 times. The remarkable increase in yield per cow

was obtained through improved management as well as imports of high producing cows. For the last 34 years, the number of cows increased quickly but the increase in yield per cow was relatively low. Yield per cow is far less than that in USA (7,277 kg), Dutch (6,769kg), Japan (6,764kg). On the basis of results of the test records we should develop a test model to select cows and apply the model to improve dairy herds.

Table 3. Annual milk production and average yield

Year	Head	Miking cow	Production(MT)	Yield(kg)/cow
1963	2,406	1,327	4,512	2,841
1973	52,424	22,976	104,082	3,785
1983	274,783	125,435	716,384	4,772
1990	503,947	272,963	1,754,964	5,372
1991	495,772	262,948	1,742,665	5,098
1992	508,241	262,948	1,742,665	5,372
1993	553,343	274,034	1,858,929	5,662
1994	552,139	279,649	1,917,398	5,729
1995	553,467	286,320	1,998,445	5,830
1996	551,493	-	2,100,022	5,959

Source : 1996 Dairy Farming Yearbook by Chuksan Shinmoon

### 3. Consumption of Dairy Products

Milk consumption has increased (Table 4) with economic development. During the 1960's milk consumption increased by 40–50% yearly, during the 1970's by 20% and during the 1980's by 10% after 1988 when per capita milk consumption approached 40kg/year. Between 1988 and 1996 the yearly increase was only 4.1% and the 1996 per capita consumption was 54.50kg. This increase was mainly due to imported powdered milk.

Yearly milk utilization pattern (Table 5) shows that a main product is market milk (more than 77% of the total). Before

the end of 1962, there was no other products than market milk.

In 1962 evaporated milk began to be produced, and a proportion of market milk decreased year by year. Especially, in 1965, milk powder production started, resulted in the proportion to be 40% in 1969. But with the school lunch program started in 1970, market milk increased with some fluctuation, and the proportion was more than 70% in 1985. This situation was much different from that in developed countries such as ten countries joining EC, which show 25% of milk consumption as raw milk and England 54% and Japan 59%.

Table 4. Production and consumption of raw milk

Year	Miking Cow	Production	Per Capita		Total Population	Total Consumption
			GNP	Consumption		
1963	1,327	4,512	100	168	27,262	4,512
1964	2,073	7,130	103	187	27,984	6,988
1965	2,968	10,685	105	304	28,705	10,474
1966	3,946	14,600	125	477	29,160	13,914
1967	4,958	19,188	142	599	30,131	18,762
1968	6,090	24,360	169	716	30,838	24,034
1969	8,650	35,470	210	1,111	31,544	35,037
1970	12,067	51,888	248	1,518	31,435	49,688
1971	14,202	65,307	289	1,981	32,883	62,184
1972	17,745	79,852	319	2,383	33,505	79,852
1973	22,976	104,082	396	3,052	34,103	104,082
1974	30,016	126,901	542	3,658	34,692	126,901
1975	32,312	162,926	594	4,604	35,281	162,435
1976	39,560	199,556	803	5,548	35,849	198,892
1977	50,759	263,558	1,012	6,982	36,412	254,246
1978	59,809	324,328	1,396	8,815	36,969	325,867
1979	70,557	384,714	1,644	9,975	35,534	374,410
1980	84,114	457,580	1,592	10,802	38,124	411,809
1981	93,950	517,657	1,734	14,403	38,723	557,722
1982	103,282	580,124	1,824	15,070	39,331	592,720
1983	125,435	716,384	2,002	18,255	39,910	728,575
1984	147,407	844,299	2,158	20,628	40,406	833,504
1985	179,532	1,011,114	2,194	23,827	40,806	972,279
1986	204,206	1,159,358	2,505	28,225	41,184	1,162,400
1987	24,071	1,418,198	3,110	34,270	41,575	1,424,765
1988	266,055	1,634,682	4,127	39,370	41,975	1,652,255
1989	276,947	1,764,397	4,968	38,731	42,383	1,641,548
1990	272,963	1,754,964	5,569	42,788	42,793	1,879,205

Year	Milking Cow	Production	Per Capita		Total Population	Total Consumption
			GNP	Consumption		
1991	262,948	1,742,665	6,757	43,201	43,268	1,869,205
1992	269,121	1,917,422	7,007	43,982	43,664	1,920,441
1993	274,034	1,858,929	7,466	45,032	44,050	1,983,673
1994	279,649	1,918,590	8,493	46,754	44,453	2,078,347
1995		1,988,445		47,800		2,143,841
1996		2,100,022		54,500		2,465,362

Source : 1996 Dairy Farming Yearbook by Chuksan Shinmoon

Table 5. Utilization pattern of raw milk

Year	Utilization(%)		Year	Utilization(%)	
	Market Milk	Other Use		Market Milk	Other Use
1962	95.2	4.8	1985	71.0	29.0
1965	72.5	27.5	1987	75.4	24.6
1967	57.2	42.8	1988	77.4	22.6
1969	40.7	59.3	1989	67.3	32.7
1971	43.7	56.3	1990	74.5	25.5
1973	54.7	45.3	1991	74.9	25.1
1975	72.8	27.2	1992	74.7	25.3
1977	62.2	37.8	1993	73.6	26.4
1979	60.1	36.6	1994	76.9	23.1
1981	66.6	33.4	1995	77.9	22.1
1983	69.7	30.3	1996	77.6	22.4

Source : 1996 Dairy Farming Yearbook by Chuksan Shinmoon

The high proportion of market milk shows possibility that domestic milk production can be protected from imported manufactured milk products (Table 6). Among manufactured dairy products, both fermented milk and cheese are rapidly increasing. In 1971, liquid fermented (set type) milk was produced for the first time. A stirred type yogurt and a drink-type yogurt started to be sold in 1981 and 1988 respectively. With fluctuating production, these products selling increased by 10% every year and amounted to that equivalent to 742,400 million ₩ in 1996. Among the fermented milk products, a drink-type yogurt carries more market (Table 7 and 8). The consumption of infant formula milk powder increased by 20% every year from 1970 to 1978, decreased recently because of campaign for breast feeding by WHO.

The rate of increase in consumption of whole milk powder was high but decreased after 1988. Whole milk powder did not replace the demand for market milk, but should be rearranged in line with raw milk supply. Skim milk powder used mostly

for fermented milk and lactic acid drink productions and may change with popularity of lactic acid products. Moreover it may be used in bakery and ice-cream manufacture.

Evaporated milk consumption decreases the world over as well as in Korea. Butter manufacture started in 1964 for the first time in Korea and has experienced cycles of shortages and excesses in supply. Nevertheless the consumption is increasing steadily. Unlike in other countries where butter is made as a desired product, skim milk powder being a by-product, in Korea butter is produced as a by-product to produce skim milk that can be used for lactic acid products. As a result, among the dairy products butter is rather cheap compared to the international price.

The rate of cheese consumption is 40-60% per year although total production and consumption are small. The consumption of cheese in Korea is expected to increase someday and thus developed countries are trying to take over Korean cheese market.

Table 6. Consumption of dairy products

Unit : M/T

Year	City Milk (1,000mt)	Processed Milk (1,000mt)	Milk Power			Evaporated Milk	Butter	Cheese	Fermented Milk
			Modified	Whole	Skim				
1983	448	77	18,881	8,034	3,715	1,332	1,635	183	116,156
1984	531	85	18,525	7,630	5,287	1,882	1,990	295	124,559
1985	648	93	18,750	11,030	6,046	2,438	2,844	478	146,770
1986	837	88	17,377	9,223	5,996	2,338	3,688	679	173,890
1987	1,020	87	19,534	12,557	8,939	2,806	3,793	2,087	192,595
1988	1,213	92	20,758	10,086	10,591	2,035	3,893	5,067	225,963
1989	1,123	82	22,412	9,125	13,371	2,317	4,905	4,764	283,990
1990	1,242	94	25,535	15,302	18,302	3,448	7,254	6,712	352,837
1991	1,247	103	26,276	8,578	19,091	3,982	4,805	8,503	402,281
1992	1,302	108	30,116	6,059	19,120	3,069	3,772	9,320	460,284
1993	1,286	122	26,737	4,205	21,686	2,855	4,067	11,938	465,095
1994	1,376	175	25,472	3,544	19,433	3,301	3,074	13,182	524,407
1995	1,311	248	25,221	2,937	13,081	3,843	3,403	13,881	584,773
1996	1,316	313	26,587	5,582	30,544	5,210	4,200	20,843	548,197

Source : 1996 Dairy Farming Yearbook by Chuksan Shinmoon

Table 7. Sale and Expansion rate of fermented milk

Year Item	1990	1991		1992		1993		1994		1995		1996	
	A	A	B	A	B	A	B	A	B	A	B	A	B
SY	2,056	2,297	11.7	2,388	4.0	2,459	2.9	2,856	18.9	2,428	6.5	3,524	2.8
STY	754	1,267	68.0	1,437	6.3	1,330	7.4	1,452	11.2	1,705	4.8	1,606	△5.8
DY	11	146	1,137	383	162.3	758	98.0	1,028	35.7	1,674	49.7	2,295	37.1
Total	2,821	3,710		4,208		4,547		5,336		6,807		7,425	
Expansion rate to the previous year(%)		3.15		13.4		8.1		17.4		27.6		9.1	

SY : Set type yoghurt, STY : Stirred type yoghurt, DY : Drink type yoghurt

A : Sale amount B : Expansion rate

Source : Milk(1997, Summer) by Korea Milk Processing Association

Table 8. Sales value of fermented milk products

Item\Year	1990	1991	1992	1993	1994	1995	1996	1997. 3
SY(%)	72.9	61.6	52.3	57.9	53.5	50.3	47.5	44.5
STY(%)	26.7	34.4	38.7	30.8	27.2	25.0	21.6	22.6
DY(%)	0.4	4.0	9.0	11.3	19.3	24.7	30.9	32.9

SY : Set type yoghurt, STY : Stirred type yoghurt, DY : Drink type yoghurt

Source : Milk(1997, Summer) by Korea Milk Processing Association

#### 4. Import of Milk Products

Total milk consumption in 1996 was 2,465,000 tons, of which 1,991,000 tons was domestically produced, and 474,000 tons was imported. Self-sufficiency ratio of milk decreased from 100% in 1988 to 81% in 1996 (Table 9). Yearly imported dairy products are shown in Table 10. Market was opened for import of milk powder and cheese in 1995, butter and evaporated milk in July 1996. In 1991 the amount of imported milk was 53,000 tons, mostly powder milk and in 1992, 45,000 tons. In 1995 the amount of imported dairy products was 98,000 tons which accounted for 9.1% of total consumption. But in 1996 when markets for dairy products was completely opened, the amount reached 95,000 tons, which was increased 19% comparing to 1988. Import of milk products are expected to rise gradually. Imitation milk powder and cheese will be imported much more than any

other products. This increase in imitation milk import is because domestic milk powder is expensive and customs tax for imported milk powder is high, but the price of imitation milk powder is the same as the price of domestic milk powder. Manufacturing cookie and bread, which uses most milk powder, uses imitation milk powder. In addition to imitation milk powder, import of cheese, butter, infant formula milk powder, and whey powder increased in 1996 compared to that of the previous year. Demand for skim milk powder and whole milk powder are expected to be on the rise, although customs tax is high and international stock decreases. Foreign enterprises from America or Australia are preparing to take over local market. It would be possible that imports of dairy products increase if the time limit for marketing increases and foreign enterprises can find local dealers.

Table 9. Milk demand and supply

Unit : 1,000 units, 1,000 MT, %

Item	1983	1988	1990	1995	1996
• No. of dairy cattle (head)	275	480	504	553	552
• Milk consumption (MT)	729	1,652	1,879	2,114	2,465
(Per capita)	(18.3kg)	(39.4)	(42.8)	(47.8)	(54.5)
– Domestic (MT)	719	1,652	1,879	1,948	1,991
– Imported (MT)	10			196	474
• Rate of self supply (%)	99	100	100	91	81
• Price of raw milk	313won/kg	322	364	450	450

Source : 1997 Livestock Yearbook by Nong Su Chuksan Shinbo

Table 10. Import of milk and milk products

Item	1991	1992	1993	1994	1995	1996
Market Milk	Ton		691	9,552	9,906	6,191
Whole Milk	4,157	880	2,183	1,327	532	221
Skim Milk	12,945	7,950	12,660	10,254	7,044	874
Evaporated Milk		1			78	50
Yoghurt		14	48	19	291	517
Butter Milk			1,745			
Whey	17,291	18,540	20,007	27,179	39,926	45,974
Butter	2,508	370	514	515	498	535
Cheese	121	200	265	3,121	11,073	14,777
Lactose	8,467	8,967	9,979	11,424	12,691	11,643
Modified Food	540	1,623	1,876	6,838	10,863	8,818
Casein	7,259	6,933	6,284	6,167	5,888	5,502
Total	53,288	45,478	56,252	76,396	98,791	95,102
The Increased Rate to the Previous Year(%)		△14.7	23.7	35.8	29.3	△3.7
Imitation Milk Powder				15,560	28,007	32,242

Source : Livestock(1997.8) by National Livestock Cooperative Federation

### 5. Expectation of Demand for Milk and Milk Products

The expectation of the future demand for milk is not so high that the increase will not be much, and major consumption of dairy products will depend upon import (Table 11). Only market milk is made from domestic raw milk, and consumption of

market milk is well related to demand for milk. Nevertheless milk processing enterprise prefer to choose processed milk and special milk for which they can decide the price.

Dairy farmers have to promote milk consumption by means such as advertisement.

Table 11. The demand of milk in the future

Unit : 1,000 MT

Year	Total Demand	Per Capita (kg)		
		City Milk	Manufacturing Products	Total
1994	2,165	33.6	15.1	48.7
1995	2,326	35.8	16.1	51.9
1996	2,493	38.0	17.1	55.1
1997	2,661	40.2	18.1	58.3
1998	2,838	42.4	19.2	61.6
1999	3,017	44.6	20.4	65.0
2000	157.0	146.4	151.7	148.0
2001/1994(%)	157.0	146.4	151.7	148.0
The Average Rate of Expansion per Year(%)	6.7	5.6	6.1	5.8

Source : 1996 Dairy Farming Yearbook by Chuksan Shinmoon

### 6. Milk Processing Industry

There was only one milk processing factory in 1962, but the number increased to 62 factories in 1996. Among them the private plants are 45(73%) and cooperatives are 17(27%) as shown in table 12. Recently the ability of cooperatives to process milk has increased step by step.

Until 1962, the market milk was the only dairy products, but all kinds of products have been developed later (Table 13). After 1990s started, products have improved to satisfy consumers since 1990 and it encouraged to manufacture different categories of products.

Table 12. The number of milk plants

Item	No. of Plant		Capacity		Manufacturing Capacity	
	No.	Rate(%)	Ton/day	Rate(%)	Ton/day	Rate(%)
Milk producers' cooperatives	17	27	1,645	31	491	15
Milk Company	45	73	3,681	69	2,787	85
Total	62		5,326		3,728	

Source : Chuksan Shinmoon(1997. 10. 3)

Table 13. The history of major dairy products in Korea

Starting date	Company	Products
1937. 7.	Seoul Milk Co.	City milk
1962. 12.	Seoul Milk Co.	Sweetened condensed milk
1964. 7.	Seoul Milk Co.	Salted butter



Starting date	Company	Products
1965. 5.	Seoul Milk Co.	Modified milk power
1967. 2.	Namyang Milk Co.	Unsweetened condensed milk
1967. 12.	Imsil Cheese Co.	Natural cheese
1968. 2.	Seoul Milk Co.	Cholate Milk
1969. 6.	Seoul Milk Co.	Ice cream
1969. 12.	Seoul Milk Co.	Whole milk power
1971. 6.	Seoul Milk Co.	Skim milk power
1971. 8.	Hankuk Yakult Co.	Set type yoghurt
1972. 3.	Namyang Milk Co.	Sterilized milk
1974. 5.	Samyang Food Co.	Processed cheese
1981. 1.	Samyang Food Co.	Stirred type yoghurt
1984. 7.	Seoul Milk Co.	Lactose hydrolyzed milk
1986. 7.	Maeil Milk Co.	High fat milk
1987. 1.	Haitai Milk co.	Low fat milk
1987. 2.	Namyang Milk co.	Modified milk
1987. 4.	Haitai Milk Co.	Slice cheese
1988. 6.	Pasteur Milk Co.	Drink Type yoghurt
1989. 1.	Maeil Milk Co.	Whipping cream
1992. 3.	Lotte Samkang Co.	Frozen yoghurt
1994. 8.	Namyang Milk Co.	DHA milk

Source : 1996 Dairy Farming Yearbook by Chuksan Shinmoon

## Issues and Problems

### 1. Distribution System for Market Milk

A major way of selling market milk in Korea had been home delivery until the 1980's. But milk is sold in restaurants, department stores, grocery stores and large-scale supermarkets which decreased direct home delivery. Except for school lunch and military personnel use, direct home delivery takes 48.9% of the current supply of market milk, store selling 42.2% and the rest 8.9%. In USA, West Germany and France milk distribution depends mostly on the sale in large scale supermarkets, and in Japan direct home delivery takes 7%, store sale more than 70%.

In order to reduce the distribution cost and the sale price, we need to reduce multi-step selling and direct home delivery and increase supermarket sale.

### 2. Classification of Market Milk Quality

A few month ago, there was a debate on a high quality(the

first grade) milk and pricing system has changed that dairy farmers will be paid according to hygienic grades of raw milk. This grading includes the number of somatic cells and bacteria. High quality market milk can be produced by pasteurization at a low temperature and some DHA added milk is also sold (Table 14 and 15). These kinds of high-priced products are generally packed in a high-priced container and the industries try to advertise their products as quality products.

But these products by the price increase and the excessive advertisement are the products which are against the principle of increasing the basic layer of milk consumers. There is no milk market in the world, which is comparable to that in Korea where too many special milk products are sold. The more advertised special milk products are, the more they are sold. This decreases total milk consumption, and have a damaging effect on dairy farmers and general consumers. These products may disappear when common sense works and consumers are educated on wholesome foods.

Table 14. Trend in special milk sale(1996)

Unit : 1,000/200ml/day

Item	June	July	August	Sep
Total number of major company's sale	1,541	1,701	1,810	1,679
The ratio special milk to total sale(%)	—	—	14.2	12.8

Source : Seoul Milk(1996. October) by Seoul Dairy Cooperative

Table 15. Special milk sale by 5 major milk companies

Company	Enriched nutrients	Sale amount per month(1997)			
		Feb	March	April	May
A	Ca, Fe, Vitamin	810	870	890	870
B	Natural DHA	520	610	580	550
C	1'st grade raw milk, Ca	180	210	210	190
D	Ca, Fe, Vitamin	140	160	150	110
E	High fat	120	120	120	110

Source : Seoul Milk(1996. October) by Seoul Dairy Cooperative

### 3. Reduction of Companies Distributing Milk to Whole Nation, but Increasing Local Distributors

Milk is produced twice a day and spoiled easily. The system of producing, processing and consuming milk in close areas will benefit dairy farmers, milk processing plants and consumers. Our distribution problem comes from the fact that many big companies supply whole nation with milk processed in a few places, resulting in decreased quality of milk consumed, increased collection and distribution costs. This problem should be settled by collecting milk into a nearby factory i.e., production and supply of raw milk should be done by dairy farm cooperatives.

### 4. Hygienic Raw Milk Production

Recently, as consumers' concern on safety of foods increases, hygiene in production is critical to survival of dairy farming in Korea.

Since a grading system for raw milk was practised in april,

1993, milk quality improved. The higher standard for raw milk grade(number of bacterial and somatic cells) set by the government played a role in decreasing bacterial counts from 1 million/ml in 1993 to 500,000 in 1997 and somatic cell counts from 750,000 to 500,000 during the same period(Table 16).

Table 17 shows a recent grade statistics. The first grade milk increased while lower than the 4th milk decreased. The first grade milk was 82.2% and the first plus second-grade milk was 92.7% on the basis of bacterial counts in march, 1997.

The accuracy of these data is subject to debate because collection and inspection of milk are not done by the same organization and the fairness of inspection is questionable.

This problem may be solved when a common inspection system is applied according to the dairy promotion law. Dairy farmers should work hard to improve milk quality i.e., produce first-grade milk, cull cows with mastitis, keep withdrawal periods for antimicrobial agents. They have to find a way to use the low quality milk with lower than the second grade.

Table 16. Hygienic grade of raw milk

Unit : 10,000

Item		'93. 4. 20 (Establishment)	'95. 10. 16 (1st revision)	'96. 7. 1 (2nd revision)	'97. 3. 1 (3rd revision)
Bacterial Count	1st Grade A	—	less than 3	less than 3	same as left
	1st Grade B	less than 10	3 less than 10	3 less than 10	
	2nd Grade	10 less than 25	10 less than 25	10 less than 25	
	3rd Grade	25 less than 50	25 less than 50	25 less than 50	
	4th Grade	50 Below 100	50 less than 100	50 excess	
	Not passed	100 excess	100 excess	Elimination	
Somatic Cell Count	1st Grade	25 below	20 less than	less than 20	less than 20
	2nd Grade	25 less than 50	20 less than 40	20 less than 50	20 less than 50
	3rd Grade	50 less than 75	40 below 75	50 below 60	50 excess
	4th Grade	—	—	60 excess	Elimination
	Not Passed	75 excess	75 excess	Elimination	Elimination

Source : Livestock(1997. 8) by National Livestock Cooperative Federation

Table 17. The number of bacteria in raw milk

Item(No. of Bacterial 10,000/ml)		95.7(A)	96.7(B)	96.9	96.11	97.1	97.3
1st Grade A	less than 3	62.1	35.2	41.6	51.2	53.9	55.0
1st Grade B	3 less than 10		31.6	31.9	29.2	28.1	27.2
2nd Grade	10 less than 25	19.5	18.3	15.4	11.1	10.5	10.5
3rd Grade	25 less than 50	8.9	8.0	6.2	4.6	4.2	4.0
4th Grade (Including Not Passed)	50 Excess	9.5	6.9	4.9	3.9	3.3	3.3

Source : Livestock(1997.8) by National Livestock Cooperative Federation

### 5. Poor Competitiveness in International Markets(Higher Production Costs)

When milk production costs are compared between Korea and USA(Table 18), Korea shows 1.6 times higher in feed costs, 4.1 times higher in labor and 1.2 times higher in capital interest than USA. Production costs/kg milk in Korea in 413 ₩ which 226 ₩ in USA.

This difference is due to smaller scale, labor-intensive,

low quality roughage, high proportion of concentrates, low per cow milk productions, poor reproduction etc. As a consequence, the prices of various milk products produced in Korea are higher than those of imported products(Table 19). To reduce production costs, dairy farmers need to increase farm size, improve cow quality, use family labor, enhance feeding and management.

Table 18. The cost of raw milk production

Item	Feed	Labor	Capital interest	Etc.	Total
Korea(A)	200Won/kg	145	63	5	413
USA(B)	123	35	51	17	226
A/B	1.6times	4.1	1.2	0.2	1.8

Source : Livestock(1997.8) by National Livestock Cooperative Federation

Table 19. Comparison between domestic and imported product prices

Item	Domestic production Price(A)	Imported Price				Comparison	
		CIF price (B)	Custom ('96 rate)	Margin	Total(C)	A/B	A/C
City milk	195 (200ml)	109 (\$ 0.68/l)	44 (40%)	9	162	179%	120%
Skim milk Power	5,700 (kg)	1,749 (\$ 2,186/l)	3,694 (211.2%)	140	5,583	326	102
Imitated milk power	5,700 (kg)	1,973 (\$ 2,466/l)	789 (40%h)	158	2,920	289	195
Pizza chesse	8,370 (kg)	2,720 (\$ 3.4/l)	1,088 (40%)	218	4,026	308	208
Process cheese	6,160 (kg)	2,640 (\$ 3.3/l)	1,066 (40%)	211	3,907	233	158
Butter	5,294 (kg)	2,240 (\$ 2.8/l)	2,173 (97%)	179	4,592	236	115

Source : Livestock(1997.8) by National Livestock cooperative Federation

#### 6. The Rest for Us to need to do

- ① Environmentally sound dairy farming
- ② Change rules and regulations
- ③ Improve management skill
- ④ Automation of facilities

#### Perspectives

In the near future, 30~40% of domestic market will be shared imported products. If milk quality problems are realized again by consumers, they will turn away from domestic milk. Some milk processing plants change their strategy using less milk or no milk in their products. This trend will continue in years to come. When they use less milk, dairy farmers will suffer and some, less competitive, will disappear.

The government should be willing to keep dairy farming and processing industry by reviewing laws and regulations to improve dairying systems. Farmers should work hard to modernize farming systems and cooperatives. Processors and manufacturers should reduce too much advertizing but enhance products so that consumers can trust them by continuing their effort to develop new products and better operations.

Some investment is necessary to give incentives to universities and research institutions, and farmers to contribute to efficient production and research. By joining International Dairy Federation(IDF), farmers need to learn from techniques and experiences of other countries. Dairy Research Institute is needed to do research, collect information, implement research result to production.

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