

Japan's Dairy Industry: A Study in Structural Adjustment

by

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Abstract

Japan's historical and current farm labor force, and milk production and trade situation in particular, are analyzed as the bases for projections of dairy farm structural adjustment. It is concluded that the total number of dairy farms will decline from 34 thousand in 2000, to about 20 thousand in 2010. A comparative analysis with the United State reveals its dairy farms will decline from 105 thousand in 2000, to about 75 thousand in 2010. The major reasons are increases in milk yield per cow and shifts to larger size farms.

酪農の構造調整を予測する基盤として、日本の歴史的、ならびに現在の農業労働力、特に乳製品の生産と貿易の実情を分析する。酪農家数が20700年の3万4千戸から2010年には2万戸までに減少するであろうと言うのが結論である。アメリカに関する同様の分析においても、酪農家数は2000年の10万5千戸が2010年には7万5千戸になると考えられる。主な原因は一頭あたりの生乳生産量の増加と酪農の大規模化への移行であると考える。

Key word: Dairy, cows, dairy farms, milk, production, Japan, USA, Projections

“For some considerable time now, the collapse of Japan's farming villages and the nation's agriculture has been seen in the decline of the agricultural work force...” from an editorial, *Mainichi Shimbun* April 12, 1992.

“The government of Fukuoka Prefecture announced that the first calf using research to increase stocks of so-called ‘super milking cows’ in Fukuoka was born on July 27.... The research aims to produce in a short period of time super milking cows capable of producing 12,000 kilograms of milk per year by using cutting-edge embryo transplant (ET) technologies.” *Japan Agrinfo Newsletter*, October 2001.

"With more measures like these, the LDP might win enough consumers' support to embolden it to defy the farmers and allow imports to drive down the ludicrous prices of rice, meat and milk." *The Economist*, July 25, 1992, p. 17.

“In varying degrees, food security is a serious matter in any country. In the future, we will need to dispense with the notion that our economic strength allows us to import food we need to feed ourselves. Like it or not, as one of the world's biggest importers of food, Japan's actions will be the focus of close international attention.” From an editorial *Yomiuri Shimbun*, May 6, 2001.

There are many adjectives used to describe the painful process of change being witnessed by virtually all agricultural sub-sectors in the developed world. But the terms "right-sizing", and "down-sizing", "structural adjustment", "regionalization", "modernization" and so forth somehow fail to capture the anguish and gut-wrenching decisions faced by farm families leaving agricultural production when they come to grips with the fact that they will soon be just a statistic. Economic paradigms do not include family relocation and lost dreams. Farmers--just plain ordinary folks trying to make a living at something they love--are often treated simply as inputs along with capital, land and equipment in micro-economic theory. Worse yet, they inhumanly become dots on graphs depicting unit costs as scale economies and farm numbers are simply plotted out.

This article analyzes dairy industry adjustment in Japan. A comparative analysis is made with the United States because there are more similarities than dissimilarities between the two country's dairy industries, their problems and their producers than there are dissimilarities.

But, to understand the process, and to make decisions about what can and should be done through national and international policy mechanisms and trade organizations such as the WTO, we should place ourselves in the boots of dairy farmers, from the viewpoint of their wives patiently tending to house and helping in the farm and their families. We should talk with the children of these dairy families and learn of their fears, ambitions and concerns about whether they should follow their family's method of livelihood. We should, but, due to funding constraints this study is necessarily based mainly on secondary data, and many visits to dairy farms in both Japan and the United States by Simpson. Nevertheless, we do continuously think about whether there will there be a place for them in an industry that is "right-sizing" on both sides of the Pacific.

Technology: A Blessing or a Hardship

The great technological advances in agriculture this century have been both a blessing and a hardship. In the developed nations the advances have mitigated the spectra of a really bad crop year when some of our grandparents, and certainly those in Japan, wondered if there would be food for next year. Food surpluses have led Americans to depend on exports of agricultural commodities as a means to help balance their international payments. But, with vast technological advances in many countries, markets have shrunk. Liberalization of Japan's beef and citrus imports, erosion of agricultural product markets and a continued enormous balance of payments deficit have resulted in calls by some segments in the United States for Japan to further

liberalize its dairy imports. This certainly will be a topic of discussion in the upcoming round of WTO trade negotiations.

Technological advances in products and genetics, as well as management, have led to amazing milk yield increases in both the United States and Japan, and it appears that the percentage changes will continue well into the next century. Consumers have been the beneficiaries of cheap, wholesome, healthful milk and a myriad of milk products. The economist smiles and points to another job well done. But across the land, in Europe, the United States and more slowly in Japan, both producers and consumers are asking "HOW MUCH TECHNOLOGY?" When does it stop, this mad dash for scientific supremacy? The question of bovine growth hormone or BGH has launched Americans into a soul searching about how much technology is desirable. This is heresy to many economists and animal scientists and is epitomized by the raging battle among dairy producers. For example, it resulted in a moratorium in Wisconsin and Minnesota against use of the milk production enhancing product BGH, and has become a *cause célèbre* for some interest groups.

The much-publicized case of BGH is mirrored by the European community's decision to ban the use of growth promotants in cattle being raised for meat. Japan continues to allow BGH (Simpson, et.al.1996). In both cases, the products have been shown to have no adverse effects on animals, and for the meat and milk to be completely safe for human consumption. The larger issue which society is grappling with is the extent to which new technology should be developed and diffused. Changes in production method and industry structure are part of society's evolutionary process. The issue is who should control the process, how much control should be exercised, and international trade implications.

Milk Industry Liberalization in Japan?

Japanese dairy producers are extremely worried about liberalization of milk products because they recognize Japan is a very high cost industry (about 70 yen per kg in Japan versus 36 yen in the USA)(Japan Dairy Council, 2000 and various issues of Hoards Dairyman). But, many American and Canadian dairy producers are also united against liberalization of milk imports due to cost concerns and a bewildering array of export subsidies, mainly in the EU (European Union). Producers in all of these countries can be characterized as feeling that they are only pawns in the gigantic chess board of trade policy. On the North American side of the Pacific, producer's organizations are in disarray and a raging battle is being fought over the way in which milk will

be priced, for that determines regional shifts (more structural adjustment) and ultimately who will survive. The cost of long distance milk transport, despite milk's bulky nature, is a sufficiently small percentage of final product prices that other factors will be the determinant of regional relocations.

A review of Japan's dairy industry now begins. Although this is a statistical analysis, we emphasize again that we would like to have it thought of in human terms to determine if there is some way in which the ugly political environment which surrounded the beef and citrus trade liberalization negotiations, (and now rice), might be avoided for dairy products. It is with this mission in mind that the reader should evaluate the statistical evidence, formulate alternatives and make judgments about policies which Japanese and Americans might adopt regarding Japan's dairy industry over the next decade.

Farm Household and Population Changes

The number of households in Japan, both urban and rural, increased from 28 million in 1970 to 41 million in 1990 and 47 million in 2000 (Table 1). Concurrently, farm household numbers dropped from 5.4 million to 3.8 million in 1990 and 3.1 million in 2000, a 43 percent decline over the 30-year period. The ratio of farm to total households declined 66 percent, from 19 percent of the total in 1970 to 7 percent in 2000. Greater detail is provided in Appendix 1.

There were only 845,000 full time farm households in Japan in 1970 (Table 1). By 2000 that number had fallen to 426,000, a 50 percent decline. Less than one percent of Japan's farm households are full time producers. However, there are another 350,000 part time farm households that are mainly devoted to farming. Their number declined 81 percent from 1970 to 2000.

Japan has a sizeable number of residences considered as farm households. But, careful examination of the data reveals that few are commercial size operations and that in reality the proportion of "farm households" to "non-farm households" in Japan is not so different than in the United States (about 7 percent versus 2 percent). A major difference is that because Japan is so small geographically relative to its population, there are a disproportionate number of people who live in semi or rural areas and work in industry. There is also a disproportionate amount of the population that engages in very small-scale urban area agriculture, particularly rice farming and vegetable production.

Dairy Industry History

The dairy industry of Japan, just like beef production as an industry *per se* in Japan, is relatively new, since milk and dairy products did not begin to enter into general diets until the 1920s, and not to any great extent until after World War II. Improved breeds of dairy cattle were introduced into Japan during the Tokugawa Period (1603-1867), probably by the Dutch. But, in the early period milk was mainly used by evaporating it and ingesting the concentrate as a drug for treating tuberculosis and syphilis (Simpson, Yoshida, Miyazaki and Kada, 1985).

The custom of drinking milk only became accepted towards the end of the Meiji era (around 1910). However, even then it was regarded as a special nutritional drink for infants, and sick or weak people.

Condensed milk was the first dairy product to be commercially sold in Japan apart from fluid milk for drinking. Around 1910-1915 several domestic condensed milk plants were built. However, in 1912 total milk production was only 51,000 tons, virtually all of which was consumed as fluid milk. Production grew rapidly, reaching 390,000 tons in 1941 (Snowbrand, 1990). Milk production then grew to 1 million tons in 1955, 2 million tons in 1961, 3 million in 1964 and 4 million in 1968. It then jumped to 5 million tons in 1975, 7.4 million tons in 1985, and 8.5 million tons in 1995. It has remained at about that level over the past 5 years (Table 2).

Great changes have taken place in the industry, particularly over the past quarter century, and especially during the past decade. Production location within Japan has shifted from the traditional suburban farms to more distant rural areas, mainly where grazing land is more abundant. This shift has been mainly due to urbanization and developments in transportation infrastructure, which have permitted milk to be hauled economically over much greater distances.

In 1965 a relatively small amount of milk was produced in the extreme northern island of Hokkaido. In 2000, that area accounted for 50 percent of Japan's dairy cattle. Hokkaido producers, which account for just 29 percent of all dairy households due to their larger scale of operations, could easily expand production if a market were available. The average herd size in Hokkaido in 2000 was 85 head (including calves and heifers) compared with 53 head in all Japan.

The Demand Side of the Equation

The Japanese are essentially of one nationality, one language and one culture. Most Japanese feel they share similar living standards, behavior and values. Indeed, most feel they belong to the middle class. They are extremely conscious about the image of products or services

they consume and tend toward products with established reputations.

Japanese, as rational economic beings, are of course price conscious. Equally as important, they are image consciousness which brings with it concern about quality, freshness and product safety. Packaging and appearance are considered to reflect the product itself. Nevertheless, Japanese are expanding their consumption of low fat milk and are increasingly concerned about cost of dairy products.

Milk Utilization from Domestic Milk

Food consumption patterns have changed in Japan, particularly over the past decade. For example, rice consumption declined steadily until the late 1990s while meat and dairy product consumption increased. Raw milk production grew 1.7 percent annually from 1975 to 2000, but declined 0.1 percent annually between 1995 and 2000, at which time total production reached 8.4 million tons (Table 2). Simultaneously, human population growth rate has declined, from 0.9 percent annually between 1975 and 1980, to 0.3 percent annually at the end of the 1990s (Appendix 1).

The proportion of milk production destined for drinking accounted for 64 percent of total raw milk production in 1975, but dropped to 60 percent in 2000 (Table 2). Approximately 39 percent is now used for processing and about 1.2 percent for other uses such as industrial products. Slow human population growth, added to relatively strong demand, has led per capita consumption (raw milk equivalent) derived from domestic production to increase from 45 kg in 1975 to 62 kg in 1985. It has remained at about 66 kg during the 1990s (Table 2). Drinking milk consumption has remained at about 66 kg during the 1990s and milk for processing at about 36 kg. Per capita consumption (raw milk basis), of drinking milk declined 0.8 percent annually between 1995 and 2000, but per capita consumption of milk for processing increased 0.5 percent annually.

Dairy Product Production From Domestic Milk

Butter production from domestic milk peaked at 91 thousand tons in 1985 but since then declined, falling to 80 thousand tons in 2000 (Appendix 3). Production of skimmed milk powder has remained at about 185-200 thousand tons since 1995. The big increase in the use of domestic milk has been for cheese, and production of it increased from 54 million tons in 1975, to 70 million tons in 1985 and 125 million tons in 2000.

Milk and Milk Product Imports and Exports

Japan exports very little raw milk, butter or skim milk powder. Data are not available for 1995 onward. In previous years exports were actually more than domestic production, indicating considerable re-exports.

There are no raw milk imports. Butter imports declined during the 1990s from 913 tons in 1990 to 472 tons in 2000 (Table 3). Cheese imports continue to grow rapidly as do imports of other milk powder, lactose and other products.

Consumption of Milk and Milk Products, and Self-Sufficiency

Total per capita consumption of drinking milk increased 1.3 percent annually between 1975 and 2000. The last five years saw a decline of 0.8 percent annually as total consumption declined to 1.5 million tons (Table 4). Per capita consumption grew from 28 kg in 1975 to 41 kg in 1991 and declined to 39 kg in 2000. There are no imports of drinking milk so the country is 100 percent self-sufficient in that item.

Japan's production of butter decreased 0.4 percent annually from 1985 to 2000 while imports declined 3.6 percent annually. Per capita consumption grew from 0.4 kg in 1975 to 0.8 kg in 1991 and has remained at about that level. The nation is nearly self-sufficient in butter.

Per capita consumption of natural cheese grew from 0.1 kg in 1975 to 0.6 kg in 1990, and 1.1 kg in 2000, an 11 percent annual rate of growth from 1975 to 2000 (Table 4). Processed cheese per capita consumption grew at just 2.6 percent annually from 1975 through 2000. Per capita consumption of total cheese at 1.2 kg in 1990 was equally divided between natural and processed cheese, but by 2000 natural cheese was considerably larger.

Japan's consumption of fluid milk (39 kg in 1998) is relatively low by standards in Canada (90 kg), USA (99 kg), and Australia (103 kg). It is much lower than some other countries such as the Netherlands (126 kg), (Japan Dairy Council, 2000). In addition, while Japan's per capita consumption of butter in 1998 was 0.7 kg, it is relatively low compared with the 3.3 kg in the Netherlands and 1.9 kg in the USA.

A major difference also occurs in cheese. The Netherlands average was 16.6 kg in 1998 while it was 14.2 kg in the USA but just 1.7 kg in Japan.

Japan increased its self-sufficiency ratio in cheese from 15 percent in 1975 to 19 percent in 1990, but it declined to 13 percent in 2000 (Table 4).

Number of Dairy Farms

The number of dairy farms in Japan has declined rapidly, and that trend continues. In 1975 there were 159 thousand dairy farms, including about 21 thousand, which only raised heifers (Table 5 and Appendix 6). By 1991 the total number declined to 59 thousand, and then fell abruptly to 32 thousand in 2001. There was a 6 percent annual rate of decline from 1975 to 2001, the same rate as from 1996 to 2001.

Size structure of dairy farms has changed in concert with total numbers. In 1975, farms with 1-9 head constituted 57 percent of all dairy farms (Table 5). By 1991 that proportion had fallen to 23 percent, and by 2001 to 11 percent. Simultaneously, farms with more than 30 head increased from 3 percent of the total in 1975, to 34 percent in 1991, and then to 55 percent in 2001. Rapid decline in the number of small farms, most of which had little or no land to raise replacement heifers, has led to a decline in the number of farms specializing in raising replacements. By 2001 there were only about 600 farm households engaged in this activity compared with 21 thousand only a quarter century earlier.

Trends similar to Japan have taken place in the United States, where the number of dairy farms decreased from 444 thousand in 1975 to 182 thousand in 1990, and 105 thousand in 2000 (Table 7).

Dairy Cattle Inventory

Japan's dairy cattle numbers, including heifers, calves and bulls (as of February 1) increased slowly but steadily until they reached 2.1 million head in 1991. They then declined rapidly to 1.7 million in 2001 (Table 6). The rate of decline was 1.9 percent annually between 1996 and 2001.

In 1975, about 27 percent of all dairy cattle were found on farms with 1-9 head (Table 6). By 1991 only 5 percent of dairy cattle were in this category, and by 2001 just 1.7 percent. The total number and proportion of dairy cattle in the 10-14 head, 15-19 head and 20-29 head categories also declined. The dramatic change was in farms with 30 head or more, where total inventory increased from 340 thousand head in 1975, to 1.5 million head in 1996 after which it declined to 1.4 million in 2001. The proportion of all dairy cattle in this category increased from 19 percent in 1975 to 82 percent in 2001. The average herd size (all dairy cattle including calves) in Japan as a whole increased from 11 head in 1975 to 30 head a decade later in 1989, and then surged to 53 head in 2001 (Appendix 2). The number in Hokkaido increased from 57 head in

1989 to 85 head in 2001 (Appendix 2).

Total cow inventory, which includes dry cows as well as cows in lactation (but not heifers two years or younger), increased from 1.1 million head in 1975 to 1.3 million in 1989, but declined to 1.1 million in 2001 (Appendix 2). In the United States total cow inventory declined from 11.1 million head in 1975 to 10.0 million head in 1990 and 9.2 million 2000 (Table 7).

Yield Per Cow: 1975 - 2000

Japan's yield of milk per cow in inventory increased from 4,422 kg in 1975, to 6,024 kg in 1995, and 7,402 in 2000 (Table 8 and Appendix 8). It increased 4.1 percent annually between 1995 and 2000.

Milk Production, Yield Per Cow and Number of Farms in the Year 2010

Japan's yield per cow grew 1.9 percent annually between 1985 and 2000. It grew at 4.1 percent annually during the last 5 years. Our analysis indicates that yield will continue to grow at least 2.0 percent annually and could easily be equal to the 2.5 percent over the next 10 years. These two growth rates have been chosen as the lower and upper bounds for projections to determine the number of dairy farms in 2010 (Table 9).

A growth rate of 2.0 percent in milk yields results in 9,023 kg per cow in the year 2010, a 22 percent increase (Table 9). A growth rate of 2.5 percent leads to 10,753 kg. These numbers are very reasonable, and probably conservative, given that many farms in Hokkaido now have yields of 10,00 kg or more. The next step is to calculate the number of cows required. Division of milk production by yield per cow indicates that the number of cows will drop between 2.1 percent and 3.8 percent annually between 2000 and 2010.

The analysis continues with calculation of the number of dairy farms in 2010. The average number of cows per farm in Japan increased from 27 to 34 head during the 5-year period 1995 and 2000. That was a 4.7 percent annual growth rate. A low projection of 43 cows per farm and a high of 46 per farm are the product of choosing a 2.4 and a 3.1 percent annual growth rate.

The number of farms dropped 5.7 percent annually between 1985 and 2000, from 63 thousand to 34 thousand. Division of the projected number of cows by the average number of cows per farm results in projected farm numbers -- between 17 thousand and 22 thousand operations in the year 2010 -- about half of what there were in 2000.

United States Farm Numbers in the Year 2000

A similar "what if" analysis to the one just described for Japan is presented in Table 10 for the United States. Milk production increased 1.1 percent annually from 1985 to 2000 (Table 10). We project it will grow from 7.6 million tons in 2000 to 81 million tons in 2010, a 0.6 percent annual growth rate. We also project milk yield will grow 2.0 or 2.8 percent annually. If so, the number of dairy cows would fall between 13 and 19 percent in the interval 2000 to 2010. The projected number of cows is a low of 7.4 and a high of 8.0 million head in this scenario.

The number of cows per farm increased 5.2 percent annually between 1985 and 2000. If that rate were reduced to be conservative, to a low of 1.3 percent and a high of 2.3 percent annually, the number of farms with dairy cows would decline from 105 thousand in 2000 to between 68 and 80 thousand in the year 2010. The conclusion is that regardless of the assumptions, there will only be about two thirds as many dairy farms in 2010 as 10 years earlier, a somewhat less dramatic change than that projected for Japan mainly because the USA's dairy industry is more mature than in Japan.

Some Final Words

Japan is suffering from very rapid agricultural structure change not only in dairy, but also in virtually all other commodities. It seems reasonable that a country should have some minimum level of self-sufficiency in agricultural products. Japan was 53 percent self-sufficient in foods (on a caloric basis) in the 1985, but it declined to 47 percent in 1990, 43 percent in 1995 and 40 percent in 1999. The big question is the appropriate level, and we believe that should be a main topic in the new WTO trade negotiations.

Milk consumption has increased in Japan, but not rapidly enough to keep up with yield per cow increases (4.1 percent annually between 1995 and 2000). Consequently, and also because Japan is a net importer of dairy products, the number of farms has declined greatly. Clearly, there are many variables to be considered when evaluating structural changes such as environmental aspects, urban growth, economics, family preference changes and so forth. But, the bottom line is that the total number of dairy farms has declined from 82 thousand in 1985 to 34 thousand in 2000. The analysis presented in this article indicates there will only be about 20 thousand dairy farms in 2010.

American dairy farmers face a similar situation to their Japanese counterparts. In fact, there are definitely more similarities than dissimilarities between the dairy industries of Japan and the United States. By the end of this decade the number of dairy farms in the United States will have fallen to about 75 thousand, compared with 269 thousand in 1985. A comparative

review of data and projections for both countries indicates that in each of them structural adjustment is happening at a bewildering pace. It is questionable about whether an acceleration of that pace will yield sufficient benefits for consumers to offset the costs in adjustments by associated agro-industries and the communities involved.

References

The Economist, "The Test for the LDP," July 25, 1992, p. 17.

Japan Dairy Council, *Dairy Facts and Figures in Japan*, Tokyo, November, 2000.

Ministry of Agriculture, Forestry and Fisheries (MAFF), *Statistical Yearbook of the Ministry of Agriculture, Forestry and Fisheries*, Tokyo, various years.

Simpson, James R., Tadashi Yoshida, Akira Miyazaki and Ryohei Kada. *Technological Change in Japan's Beef Industry*. Westview Press, 1985.

Simpson, James R., Yoichi Kojima, Ryohei Kada, Akira Miyazaki and Tadashi Yoshida. *Japan's Beef Industry: Economics and Technology for the Year 2000*. CAB International. Wallingford, Oxon, UK, 1996.

Snow Brand Milk Products Co., Ltd. "Dairy Industry in Japan and Snow Brand," Sapporo, Mimio, 1990.

Japan Dairy Council, *Seinyu Jyuyou Kakudai Jitumu Handbook (Raw Milk Demand Expansion Business)* March 2001.

U.S Department of Agriculture, National Agricultural Statistics Service, Online www.nass.usda.gov November 2001.

MAFF, Online Milk and Milk Products Statistics and Online Statistics of Dairy Product in Japan, www.maff.go.jp October 2001.

Agriculture and Livestock Industries Corporation, *Monthly Statistics June 2001*.

TABLE 1. FARM HOUSEHOLDS COMPARED WITH ALL HOUSEHOLDS, JAPAN, 1970-2000

ITEM	FEBRUARY 1					TOTAL CHANGE					ANNUAL RATE OF CHANGE				
	1970	1980	1990	1995	2000	1970-2000	1980-2000	1990-2000	1970-2000	1980-2000	1990-2000	1970-2000	1980-2000	1990-2000	
	MILLION					PERCENT					PERCENT				
HOUSEHOLDS															
ALL JAPAN	28.1	36.0	41.0	44.1	47.0	67	31	15	1.7	1.3	1.4	1.7	1.3	1.4	
TOTAL FARM HOUSEHOLDS	5.4	4.7	3.8	3.4	3.1	-43	-34	-18	-1.8	-2.1	-2.0	-1.8	-2.1	-2.0	
RATIO	19	13	9	8	7	-66	-49	-29	-3.5	-3.4	-3.3	-3.5	-3.4	-3.3	
FARM HOUSEHOLDS															
FULLTIME	845	623	473	428	426	-50	-32	-10	-2.3	-1.9	-1.0	-2.3	-1.9	-1.0	
PART TIME															
TOTAL	4,557	4,038	2,497	2,224	1,911	-58	-53	-23	-2.9	-3.7	-2.6	-2.9	-3.7	-2.6	
MAINLY FARMING	1,814	1,002	520	498	350	-81	-65	-33	-5.3	-5.1	-3.9	-5.3	-5.1	-3.9	
RURAL, VIRTUALLY NO FARMING	2,743	3,036	1,977	1,726	1,561	-43	-49	-21	-1.9	-3.3	-2.3	-1.9	-3.3	-2.3	
PROPORTION TO ALL FARM ONLY HOUSEHOLDS															
FULL TIME	15.6	13.3	12.4	12.6	13.7	-12	4	10	-0.4	0.2	1.0	-0.4	0.2	1.0	
PART TIME MAINLY FARMING	33.6	21.3	13.7	14.6	11.3	-66	-47	-17	-3.6	-3.1	-1.9	-3.6	-3.1	-1.9	
RURAL, VIRTUALLY NO FARMING	50.8	65.4	73.9	72.8	75.0	48	15	1	1.3	0.7	0.1	1.3	0.7	0.1	
PROPORTION TO ALL JAPAN HOUSEHOLDS															
FULL TIME	3.0	1.7	1.2	1.0	0.9	-70	-48	-21	-3.9	-3.2	-2.4	-3.9	-3.2	-2.4	
PART TIME MAINLY FARMING	16.2	11.2	6.1	5.0	4.1	-75	-64	-33	-4.5	-4.9	-4.0	-4.5	-4.9	-4.0	
RURAL, VIRTUALLY NO FARMING	9.8	8.4	4.8	3.9	3.3	-66	-61	-31	-3.5	-4.6	-3.7	-3.5	-4.6	-3.7	

SOURCE: APPENDIX 1.

TABLE 2. MILK UTILIZATION FROM DOMESTIC PRODUCTION, JAPAN, 1975-2000

ITEM	FISCAL YEAR					TOTAL CHANGE					ANNUAL RATE OF CHANGE				
	1975	1985	1990	1995	2000	1975-2000	1985-2000	1995-2000	1975-2000	1985-2000	1995-2000	1975-2000	1985-2000	1995-2000	
	1,000 TONS					PERCENT					PERCENT				
RAW MILK PRODUCTION	5,006	7,436	8,203	8,467	8,417	68	13	-1	1.7	0.6	-0.1	1.7	0.6	-0.1	
MILK UTILIZATION															
DRINKING	63.5	57.9	62.1	60.8	59.5	-6	3	-2	-0.2	0.1	-0.4	-0.2	0.1	-0.4	
PROCESSING	34.1	40.5	36.4	37.6	39.3	15	-3	5	0.5	-0.2	0.9	0.5	-0.2	0.9	
OTHER	2.4	1.5	1.5	1.5	1.2	-50	-20	-20	-2.3	-1.1	-4.4	-2.3	-1.1	-4.4	
CONSUMPTION PER CAPITA															
RAW MILK EQUIVALENT	44.9	61.6	66.4	67.4	66.2	47	7	-2	1.3	0.4	-0.4	1.3	0.4	-0.4	
DRINKING	28.5	35.7	41.2	41.0	39.4	38	10	-4	1.1	0.5	-0.8	1.1	0.5	-0.8	
PROCESSING	15.3	25.0	25.4	25.4	26.0	70	4	2	1.8	0.2	0.5	1.8	0.2	0.5	
OTHER	1.1	0.9	1.0	1.0	0.8	-27	-11	-20	-1.1	-0.6	-4.4	-1.1	-0.6	-4.4	

SOURCE: APPENDIX 3.

TABLE 3. MILK AND MILK PRODUCT IMPORTS, JAPAN, 1975-2000

ITEM	FISCAL YEAR(1)					TOTAL CHANGE			ANNUAL RATE OF CHANGE		
	1975	1985	1990	1995	2000	1975-2000	1985-2000	1995-2000	1975-2000	1985-2000	1995-2000
	1,000 TONS					PERCENT					
RAW MILK	0	0	0	0	0	0	0	0	0	0	0
BUTTER	2.2	1.7	1.9	0.6	0.5	-77	-71	-17	-4.8	-5.9	-3.6
SKIM MILK POWDER	44.1	104.4	87.8	87.0	55.8	27	-47	-36	0.8	-3.1	-8.5
CHEESE											
NATURAL	48.4	81.6	111.5	155.0	202.3	318	148	31	4.9	4.6	5.5
PROCESSED	0.3	0.04	2	4.4	6.9	2200	17150	57	11.0	29.4	9.4
TOTAL	48.7	81.6	113.5	159.4	209.2	330	156	31	5.0	4.8	5.6
CONDENSED MILK	1.2	0.4	0.2	0.7	1.5	25	275	114	0.7	6.8	16.5
OTHER MIK POWDER	-	-	32.1	35.3	46.2	31					
LACTOSE	50.4	71.8	80.9	87.1	95.4	89	33	10	2.1	1.4	1.8
PREP CONT COCOA	17.3	28.6	35.8	38.8	46.0	166	61	19	3.3	2.4	3.5
PREP EDIBLE FATS	2.1	16.3	21.3	24.4	28.6	1262	75	17	9.1	2.9	3.2
CASEIN	9.6	24.4	21.9	22.7	23.8	148	-2	5	3.1	-0.1	1.0

SOURCE: APPENDIX 4.

(1) 1975 AND 1985 ARE CALENDAR YEAR.

TABLE 4. MILK, BUTTER AND CHEESE CONSUMPTION, AND SELFSUFFICIENCY, JAPAN, 1975-2000

ITEM	FISCAL YEAR					TOTAL CHANGE			ANNUAL RATE OF CHANGE		
	1975	1985	1990	1995	2000	1975-2000	1985-2000	1995-2000	1975-2000	1985-2000	1995-2000
DRINKING MILK											
1,000 TONS											
DOMESTIC MILK	3,179	4,307	5,091	5,152	5,005	57	16	-3	1.8	1.0	-0.6
IMPORTED MILK	0	0	0	0	0	0	0	0	0	0	0
TOTAL CONSUMPTION	3,179	4,307	5,091	5,152	5,005	57	16	-3	1.8	1.0	-0.6
KG											
PER CAPITA CONSUMPTION	28.4	35.6	41.2	41.0	39.4	39	11	-4	1.3	0.7	-0.8
PERCENT											
PERCENT SELF-SUFFICIENCY	100	100	100	100	100	0	0	0	0.0	0.0	0.0
BUTTER											
1,000 TONS											
DOMESTIC BUTTER	39.1	90.8	74.7	83.0	86.0	120	-5	4	3.2	-0.4	0.7
IMPORTED BUTTER	2.2	1.7	9.1	0.6	0.5	-77	-71	-17	-5.8	-7.8	-3.6
TOTAL CONSUMPTION	41.3	92.5	83.8	83.6	86.5	109	-6	3	3.0	-0.4	0.7
KG											
PER CAPITA CONSUMPTION	0.4	0.8	0.7	0.7	0.7	84	-11	2	2.5	-0.8	0.4
PERCENT											
PERCENT SELF-SUFFICIENCY	95	98	89	99	99	5	1	0	0.2	0.1	0.0
CHEESE											
1,000 TONS											
NATURAL CHEESE											
DOMESTIC CHEESE	0.3	5.9	10.2	11.7	14.6	4767	147	25	16.8	6.2	4.5
IMPORTED	9.1	39.3	67.3	93.7	127.9	1305	225	36	11.2	8.2	6.4
TOTAL CONSUMPTION	9.4	45.2	77.5	105.4	142.5	1416	215	35	11.5	8.0	6.2
KG											
PER CAPITA CONSUMPTION	0.1	0.4	0.6	0.8	1.1	1235	200	34	10.9	7.6	6.0
1,000 TONS											
PROCESSED CHEESE											
DOMESTIC CHEESE	9.4	13.8	18.3	19.0	20.1	114	46	6	3.1	2.5	1.1
ATTRIBUTABLE TO IMPORTS	44.6	50.0	57.6	80.1	96.9	117	94	21	3.2	4.5	3.9
TOTAL CONSUMPTION	54.0	63.8	75.9	99.1	117.0	117	83	18	3.1	4.1	3.4
KG											
PER CAPITA CONSUMPTION	0.5	0.5	0.6	0.8	0.9	91	75	50	2.6	3.8	3.1
1,000 TONS											
TOTAL CHEESE											
DOMESTIC CHEESE	9.7	19.7	28.5	30.7	34.7	258	76	13	5.2	3.8	2.5
ATTRIBUTABLE TO IMPORTS	53.7	89.3	124.9	173.8	224.8	319	152	29	5.9	6.3	5.3
TOTAL CONSUMPTION	63.4	109.0	153.4	204.5	259.5	309	138	27	5.8	6.0	4.9
KG											
PER CAPITA CONSUMPTION	0.6	0.9	1.2	1.6	2.0	260	127	25	5.3	5.6	4.6
PERCENT											
PERCENT SELF-SUFFICIENCY	15	18	19	15	13	-13	-26	-11	-0.5	-2.0	-2.3

SOURCE: APPENDIXES 2-5.

TABLE 5. NUMBER OF DAIRY FARMS, JAPAN, 1975-2001

ITEM	FEBRUARY 1					TOTAL CHANGE			ANNUAL RATE OF CHANGE		
	1975	1986	1991	1996	2001	1975-2001	1986-2001	1996-2001	1975-2001	1986-2001	1996-2001
NUMBER OF DAIRY FARMS											
1,000											
1-9 HEAD	91.2	24.0	13.6	5.8	3.4	-96	-86	-41	-12.3	-13.0	-12.5
10-14 HEAD	18.5	10.1	6.5	3.8	2.4	-87	-76	-37	-7.8	-9.8	-10.9
15-19 HEAD	12.2	8.1	5.6	3.5	2.5	-80	-69	-29	-6.1	-8.1	-8.1
20-29 HEAD	11.5	12.1	10.1	7.2	5.6	-51	-54	-22	-2.8	-5.4	-6.1
MORE THAN 30 HEAD	4.9	18.2	20.1	20.0	17.5	257	-4	-13	5.2	-0.3	-3.3
HEIFERS ONLY	20.5	6.0	3.3	1.0	0.6	-97	-90	-40	-13.2	-15.2	-12.0
TOTAL	158.8	78.5	59.2	41.3	32.0	-80	-59	-23	-6.2	-6.2	-6.2
PERCENT											
1-9 HEAD	57.4	30.6	23.0	14.0	10.6						
10-14 HEAD	11.6	12.9	11.0	9.2	7.5						
15-19 HEAD	7.7	10.3	9.5	8.5	7.8						
20-29 HEAD	7.2	15.4	17.1	17.4	17.5						
MORE THAN 30 HEAD	3.1	23.2	34.0	48.4	54.7						
HEIFERS ONLY	12.9	7.6	5.6	2.4	1.9						
TOTAL	100.0	100.0	100.0	100.0	100.0						

SOURCE: APPENDIX 6.

TABLE 6. NUMBER OF DAIRY CATTLE BY SIZE OF DAIRY FARM, JAPAN, 1975-2001

ITEM	FEBRUARY 1					TOTAL CHANGE			ANNUAL RATE OF CHANGE		
	1975	1986	1991	1996	2001	1975-2001	1991-2001	1996-2001	1975-2001	1991-2001	1996-2001
NUMBER OF DAIRY CATTLE (1)											
1,000											
1-9 HEAD	476	169	96	43	29	-94	-70	-33	-10.2	-11.3	-7.6
10-14 HEAD	288	161	102	60	36	-88	-65	-40	-7.7	-9.9	-9.7
15-19 HEAD	269	182	127	75	54	-80	-57	-28	-6.0	-8.2	-6.4
20-29 HEAD	371	404	332	234	176	-53	-47	-25	-2.8	-6.1	-5.5
MORE THAN 30 HEAD	340	1,158	1,367	1,483	1,401	312	2	-6	5.6	0.2	-1.1
HEIFERS ONLY	41	30	17	8	7	-83	-59	-13	-6.6	-8.5	-2.6
TOTAL	1,787	2,103	2,067	1,873	1,703	-5	-18	-9	-0.2	-1.9	-1.9
PERCENT											
1-9 HEAD	26.6	8.0	4.6	2.3	1.7						
10-14 HEAD	16.1	7.7	4.9	3.2	2.1						
15-19 HEAD	15.1	8.7	6.1	4.0	3.2						
20-29 HEAD	20.8	19.2	16.1	12.5	10.3						
MORE THAN 30 HEAD	19.0	55.1	66.1	79.2	82.3						
HEIFERS ONLY	2.3	1.4	0.8	0.4	0.4						
TOTAL	100.0	100.0	100.0	100.0	100.0						

SOURCE: APPENDIX 2.

(1) MAY NOT ADD TO TOTAL DUE TO ROUNDING.

TABLE 7. MILK PRODUCTION, DAIRY FARMS, AND YIELD PER MILK COW, UNITED STATES, 1975-2000

ITEM	CALENDAR YEAR					
	1975	1985	1990	1995	2000	
RAW MILK PRODUCTION (1,000 TONS)	52,335	64,858	67,371	70,503	76,117	
COW INVENTORY (1,000 HEAD)	11,139	10,981	9,993	9,466	9,210	
YIELD PER COW (KG)	4,698	5,906	6,742	7,448	8,265	
NUMBER OF DAIRY FARMS (1,000)	444	269	182	140	105	
COWS PER FARM (HEAD)	25	41	55	68	88	
	TOTAL CHANGE			ANNUAL RATE OF CHANGE		
	1975-2000	1985-2000	1995-2000	1975-2000	1985-2000	1995-2000
	PERCENT					
RAW MILK PRODUCTION (1,000 TONS)	45	17	8	1.5	1.1	1.5
COW INVENTORY (1,000 HEAD)	-17	-16	-3	-0.8	-1.2	-0.5
YIELD PER COW (KG)	76	40	11	2.3	2.3	2.1
NUMBER OF DAIRY FARMS (1,000)	-76	-61	-25	-5.6	-6.1	-5.6
COWS PER FARM (HEAD)	250	115	30	5.1	5.2	5.3

SOURCE: MILK PRODUCTION AND COW INVENTORY FROM USDA, DAIRY SITUATION AND OUTLOOK: FARM NUMBERS FROM USDA, NATIONAL AGRICULTURAL STATISTICAL SERVICE.

TABLE 8. YIELD PER MILK COW, JAPAN, 1975-2000

ITEM	CALENDAR YEAR					
	1975	1985	1990	1995	2000	
RAW MILK PRODUCTION (1,000 TONS)	4,961	7,380	7,457	7,335	8,497	
COW INVENTORY (1,000 HEAD)	1,122	1,329	1,294	1,214	1,148	
YIELD PER COW (KG)	4,422	5,553	5,763	6,042	7,402	
	TOTAL CHANGE			ANNUAL RATE OF CHANGE		
	1975-2000	1985-2000	1995-2000	1975-2000	1985-2000	1995-2000
	PERCENT					
RAW MILK PRODUCTION	71	15	16	2.2	0.9	3.0
COW INVENTORY	2	-14	-5	0.1	-1.0	-1.1
YIELD PER COW	67	33	23	2.1	1.9	4.1

SOURCE: APPENDIX 8.

TABLE 9. YIELD PER MILK COW AND NUMBER OF FARMS, JAPAN, 1985, 1990, 1995, 2000 AND EXAMPLE FOR 2000

ITEM	1985	1990	1995	2000	MILK YIELD IN 2010 WITH GROWTH RATE OF	
					2.0	2.5
MILK PRODUCTION (1,000 TONS)	7,436	8,203	8,467	8,417	8,400	8,400
YIELD PER COW (KG)	5,553	5,763	6,042	7,402	9,023	10,753
NUMBER OF COWS (1,000)	1,329	1,294	1,214	1,148	931	781
AVERAGE COWS PER FARM (1,000)						
LOW PROJECTION (HEAD)	16	20	27	34	43	43
HIGH PROJECTION (HEAD)	16	20	27	34	46	46
NUMBER OF FARMS						
LOW PROJECTION (1,000)	82	63	44	34	22	18
HIGH PROJECTION (1,000)	82	63	44	34	20	17
TOTAL CHANGE						
					2000-2010	
	1985-2000		1995-2000		2.0 PCT	2.5 PCT
	PERCENT					
MILK PRODUCTION		13		-1	0	0
YIELD PER COW		33		23	22	45
NUMBER OF COWS		-14		-5	-19	-32
AVERAGE COWS PER FARM						
LOW PROJECTION		113		26	26	26
HIGH PROJECTION		113		26	35	35
NUMBER OF FARMS						
LOW PROJECTION		-59		-23	-36	-47
HIGH PROJECTION		-59		-23	-40	-50
ANNUAL RATE OF CHANGE						
					2000-2010	
	1985-2000		1995-2000		2.0 PCT	2.5 PCT
	PERCENT					
MILK PRODUCTION		0.8		-0.1	0.0	0.0
YIELD PER COW		1.9		4.1	2.0	3.8
NUMBER OF COWS		-1.0		-1.1	-2.1	-3.8
AVERAGE COWS PER FARM						
LOW PROJECTION		5.2		4.7	2.4	2.4
HIGH PROJECTION		5.2		4.7	3.1	3.1
NUMBER OF FARMS						
LOW PROJECTION		-5.7		-5.0	-4.4	-6.1
HIGH PROJECTION		-5.7		-5.0	-5.1	-6.7

SOURCE: VARIOUS APPENDIXES. MILK PRODUCTION PROJECTION BY AUTHORS.

TABLE 10. YIELD PER MILK COW AND NUMBER OF FARMS, UNITED STATES, 1985, 1990, 1995, 2000 AND EXAMPLE FOR 2010

ITEM	1985	1991	1995	2000	MILK YIELD IN 2010 WITH GROWTH RATE OF	
					2.0	2.8
MILK PRODUCTION (1,000 TONS)	64,858	67,371	70,503	76,117	81,000	81,000
YIELD PER COW (KG)	5,906	6,730	7,448	8,265	10,075	10,894
NUMBER OF COWS (1,000)	10,981	10,011	9,466	9,210	8,040	7,436
AVERAGE COWS PER FARM (1,000)						
LOW PROJECTION (HEAD)	41	55	68	88	100	100
HIGH PROJECTION (HEAD)	41	55	68	88	110	110
NUMBER OF FARMS						
LOW PROJECTION (1,000)	269	182	140	105	80	74
HIGH PROJECTION (1,000)	269	182	140	105	73	68
TOTAL CHANGE						
	1985-2000		1995-2000	2000-2010		
				2.0 PCT	2.8 PCT	
	PERCENT					
MILK PRODUCTION		17		8	6	6
YIELD PER COW		40		12	22	32
NUMBER OF COWS		-16		-3	-13	-19
AVERAGE COWS PER FARM						
LOW PROJECTION		115		29	14	14
HIGH PROJECTION		115		29	25	25
NUMBER OF FARMS						
LOW PROJECTION		-61		-25	-23	-29
HIGH PROJECTION		-61		-25	-30	-36
ANNUAL RATE OF CHANGE						
	1985-2000		1995-2000	2000-2010		
				2.0 PCT	2.8 PCT	
	PERCENT					
MILK PRODUCTION		1.1		1.5	0.6	0.6
YIELD PER COW		2.3		2.1	2.0	2.8
NUMBER OF COWS		-1.2		-0.5	-1.3	-2.1
AVERAGE COWS PER FARM						
LOW PROJECTION		5.2		5.3	1.3	1.3
HIGH PROJECTION		5.2		5.3	2.3	2.3
NUMBER OF FARMS						
LOW PROJECTION		-6.1		-5.6	-2.6	-3.4
HIGH PROJECTION		-6.1		-5.6	-3.6	-4.3

SOURCE: TABLE 7. PROJECTIONS BY AUTHORS.

APPENDIX 1. FARM HOUSEHOLD AND POPULATION STRUCTURE, JAPAN, 1975-2000

ITEM	UNITS	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
HOUSEHOLDS											
ALL JAPAN	1,000	32,100	36,015	38,133	41,036	44,108	44,831	45,498	46,157	46,812	47,031
TOTAL FARM HOUSEHOLDS	1,000	4,900	4,661	4,229	3,835	3,444	3,388	3,344	3,291	3,239	3,120
NON-COMMERCIAL FARM HOUSEHOLD	1,000	NA	NA	914	864	792	782	776	769	764	783
COMMERCIAL FARM HOUSEHOLD	1,000	NA	NA	3,315	2,971	2,651	2,606	2,568	2,522	2,475	2,337
FULLTIME	1,000	616	623	498	473	428	436	435	434	433	426
PART TIME	1,000	4,337	4,038	2,817	2,497	2,224	2,171	2,133	2,088	2,041	1,911
MAINLY ENGAGED IN FARMING	1,000	1,259	1,002	758	521	498	454	411	382	359	350
MAINLY ENGAGED IN OTHER JOBS	1,000	3,078	3,036	2,059	1,976	1,726	1,717	1,722	1,706	1,682	1,561
FARM OF ALL JAPAN HOUSEHOLDS	PERCENT	15.3	12.9	11.1	9.3	7.8	7.6	7.3	7.1	6.9	6.6
NONCOMMERCIAL OF ALL FARM HOUSEHOLDS	PERCENT	NA	NA	21.6	22.5	23.0	23.1	23.2	23.4	23.6	25.1
COMMERCIAL OF ALL FARM HOUSEHOLDS	PERCENT	NA	NA	78.4	77.5	77.0	76.9	76.8	76.6	76.4	74.9
FULLTIME OF COMMERCIAL HOUSEHOLDS	PERCENT	NA	NA	15.0	15.9	16.1	16.7	16.9	17.2	17.5	18.2
PART TIME OF COMMERCIAL HOUSEHOLDS	PERCENT	NA	NA	85.0	84.0	83.9	83.3	83.1	82.8	82.5	81.8
MAINLY ENGAGED IN FARMING OF PART TIME	PERCENT	29.0	24.8	26.9	20.9	22.4	20.9	19.3	18.3	17.6	18.3
MAINLY ENGAGED IN OTHER JOBS, PART TIME	PERCENT	71.0	75.2	73.1	79.1	77.6	79.1	80.7	81.7	82.4	81.7
POPULATION											
ALL JAPAN	1,000	111,940	117,060	121,049	123,611	125,570	125,864	126,166	126,486	126,686	127,096
AGRICULTURAL POPULATION	1,000	23,197	21,366	19,298	17,296	15,084	11,673	11,549	11,308	11,011	13,458
OWN FARMING ONLY	1,000	NA	NA	5,576	5,150	4,463	3,655	3,633	3,631	3,594	3,549
OWN AND OTHER FARMING	1,000	NA	NA	5,793	5,216	4,613	3,472	3,381	3,283	3,216	3,307
OTHER	1,000	NA	NA	7,929	6,930	6,008	4,546	4,535	4,394	4,201	6,602
RATIO AGRICULTURAL TO ALL POPULATION	PERCENT	21	18	16	14	12	9	9	9	9	11
-----ANNUAL RATE OF CHANGE FROM PREVIOUS YEAR-----											
HOUSEHOLDS											
ALL JAPAN	PERCENT		2.3	1.1	1.5	1.5	1.6	1.5	1.4	1.4	0.5
TOTAL FARM HOUSEHOLDS	PERCENT		-1.0	-1.9	-1.9	-2.1	-1.6	-1.3	-1.6	-1.6	-3.7
NON-COMMERCIAL FARM HOUSEHOLD	PERCENT				-1.1	-1.7	-1.3	-0.8	-0.9	-0.7	2.5
COMMERCIAL FARM HOUSEHOLD	PERCENT				-2.2	-2.3	-1.7	-1.5	-1.8	-1.9	-5.6
FULLTIME	PERCENT		0.2	-4.4	-1.0	-2.0	1.9	-0.2	-0.2	-0.2	-1.6
PART TIME	PERCENT		-1.4	-6.9	-2.4	-2.3	-2.4	-1.8	-2.1	-2.3	-6.4
MAINLY ENGAGED IN FARMING	PERCENT		-4.5	-5.4	-7.2	-0.9	-8.8	-9.5	-7.1	-6.0	-2.5
MAINLY ENGAGED IN OTHER JOBS	PERCENT		-0.3	-7.5	-0.8	-2.7	-0.5	0.3	-0.9	-1.4	-7.2
POPULATION											
ALL JAPAN	PERCENT		0.9	0.7	0.4	0.3	0.2	0.2	0.3	0.2	0.3
AGRICULTURAL POPULATION	PERCENT		-1.6	-2.0	-2.2	-2.7	-22.6	-1.1	-2.1	-2.6	22.2
OWN FARMING ONLY	PERCENT				-1.6	-2.8	-18.1	-0.6	-0.1	-1.0	-1.3
OWN AND OTHER FARMING	PERCENT				-2.1	-2.4	-24.7	-2.6	-2.9	-2.0	2.8
OTHER	PERCENT				-2.7	-2.8	-24.3	-0.2	-3.1	-4.4	57.2

SOURCE:MAFF. STATISTICAL YEARBOOK OF MINISTRY OF AGRICULTURE, FORESTRY AND FISHERIES, TOKYO, VARIOUS ISSUES.

APPENDIX 2. CATTLE INVENTORY ON DAIRY FARMS, JAPAN, 1975-2001

ITEM	UNITS	AS OF FEBRUARY 1									
		1975	1981	1984	1989	1994	1996	1997	1998	1999	2000
TOTAL NUMBER OF DAIRY CATTLE											
1-9 HEAD	1,000	476	283	201	124	62	43	40	31	31	NA
10-14 HEAD	1,000	288	209	179	131	71	60	52	47	45	NA
15-19 HEAD	1,000	269	224	194	158	88	75	68	68	61	NA
20-29 HEAD	1,000	371	445	416	393	272	234	215	198	182	NA
MORE THAN 30 HEAD	1,000	340	905	1,089	1,196	1,489	1,483	1,488	1,481	1,464	NA
HEIFERS ONLY	1,000	41	40	30	29	13	8	9	13	12	NA
TOTAL (1)	1,000	1,785	2,106	2,109	2,031	1,995	1,903	1,872	1,838	1,794	NA
PROPORTION OF DAIRY CATTLE											
1-9 HEAD	PERCENT	26.7	13.4	9.5	6.1	3.1	2.3	2.1	1.7	1.7	NA
10-14 HEAD	PERCENT	16.1	9.9	8.5	6.5	3.6	3.1	2.8	2.6	2.5	NA
15-19 HEAD	PERCENT	15.0	10.6	9.2	7.8	4.4	3.9	3.6	3.7	3.4	NA
20-29 HEAD	PERCENT	20.8	21.1	19.7	19.4	13.6	12.3	11.5	10.8	10.1	NA
MORE THAN 30 HEAD	PERCENT	19.1	43.0	51.6	58.9	74.6	77.9	79.5	80.6	81.6	NA
HEIFERS ONLY	PERCENT	2.3	1.9	1.4	1.4	0.7	0.4	0.5	0.7	0.6	NA
TOTAL	PERCENT	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	NA
ANNUAL RATE OF CHANGE											
1-9 HEAD	PERCENT		-9.9	-8.2	-9.2	-12.9	-16.3	-7.8	-22.5	-1.3	NA
10-14 HEAD	PERCENT		-6.2	-3.8	-6.1	-11.5	-8.3	-12.9	-9.6	-5.3	NA
15-19 HEAD	PERCENT		-3.6	-3.5	-4.0	-11.0	-7.8	-9.1	0.0	-9.7	NA
20-29 HEAD	PERCENT		3.7	-1.7	-1.1	-7.1	-7.2	-8.1	-7.9	-8.3	NA
MORE THAN 30 HEAD	PERCENT		21.6	4.7	1.9	4.5	-0.2	0.3	-0.5	-1.2	NA
HEIFERS ONLY	PERCENT		-0.7	-6.9	-0.7	-14.8	-19.8	7.7	44.4	-10.8	NA
TOTAL	PERCENT		3.4	0.0	-0.8	-0.4	-2.3	-1.6	-1.8	-2.4	NA
AS OF FEBRUARY 1											
TOTAL DAIRY CATTLE	1,000	1,785	2,106	2,109	2,031	1,995	1,903	1,872	1,838	1,794	NA
AVERAGE HERD SIZE PER FARM(2)											
ALL JAPAN	HEAD	11	20	24	30	42	46	48	50	51	NA
HOKKAIDO	HEAD		35	46	57	74	78	81	83	85	NA
TOTAL COW INVENTORY											
NUMBER	1,000 HEAD	1,111	1,291	1,322	1,285	1,213	1,211	1,205	1,190	1,172	1,150
ANNUAL RATE OF CHANGE	PERCENT		3.0	0.6	-0.6	-1.1	-0.1	-0.5	-1.2	-1.5	-1.9
TOTAL DAIRY FARMS											
NUMBER	NUMBER	160.0	115.0	82.4	63.3	44.3	41.6	39.4	37.4	35.4	33.6
AVERAGE NUMBER OF COWS PER FARM											
NUMBER	1,000 HEAD	7	11	16	20	27	29	31	32	33	34
ANNUAL RATE OF CHANGE	PERCENT		10.1	9.3	4.8	6.2	3.1	5.1	4.0	4.1	3.4
COWS IN LACTATION											
NUMBER	1,000 HEAD	910	1,066	1,101	1,066	1,034	1,035	1,032	1,022	1,008	977
ANNUAL RATE OF CHANGE	PERCENT		3.2	0.8	-0.6	-0.6	0.0	-0.3	-1.0	-1.4	-3.1

SOURCE: JAPAN DAIRY COUNCIL, DAIRY FACTS AND FIGURES IN JAPAN, AND MAFF, LIVESTOCK STATISTICS, DAIRY CATTLE STATISTICS.

(1) ADDITION DOES NOT ADD TO TOTAL DUE TO ROUNDING.

(2) TOTAL NUMBER OF CATTLE DIVIDED BY TOTAL NUMBER OF FARMS.

APPENDIX 3. COW MILK UTILIZATION FROM DOMESTIC PRODUCTION, JAPAN, 1975-2000

ITEM	UNITS	FISCAL YEAR, APRIL OF YEAR SHOWN THROUGH MARCH OF FOLLOWING YEAR									
		1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
RAW MILK PRODUCTION											
ANNUAL CHANGE	PERCENT		5.4	3.4	2.0	0.6	1.1	-0.3	-0.9	-0.4	-1.1
MILK UTILIZATION											
DRINKING	1,000 TONS	3,179	4,010	4,307	5,091	5,152	5,188	5,122	5,026	4,939	5,005
PROCESSING	1,000 TONS	1,709	2,311	3,015	2,985	3,186	3,351	3,396	3,419	3,470	3,308
OTHER	1,000 TONS	118	177	114	127	129	120	111	104	105	104
MILK UTILIZATION AS A PROPORTION OF RAW MILK PRODUCTION											
DRINKING	PERCENT	63.5	61.7	57.9	62.1	60.8	59.9	59.4	58.8	58.0	59.5
PROCESSING	PERCENT	34.1	35.6	40.5	36.4	37.6	38.7	39.4	40.0	40.8	39.3
OTHER	PERCENT	2.4	2.7	1.5	1.5	1.5	1.4	1.3	1.2	1.2	1.2
HUMAN POPULATION											
ANNUAL CHANGE	PERCENT		0.9	0.8	0.5	0.3	0.1	0.2	0.3	0.2	0.3
CONSUMPTION PER CAPITA											
RAW MILK EQUIVALENT	KG	44.9	55.6	61.6	66.4	67.4	68.8	68.4	67.6	67.2	66.2
DRINKING	KG	28.5	34.3	35.7	41.2	41.0	41.2	40.6	39.7	39.0	39.4
PROCESSING	KG	15.3	19.8	25.0	24.1	25.4	26.6	26.9	27.0	27.4	26.0
OTHER	KG	1.1	1.5	0.9	1.0	1.0	1.0	0.9	0.8	0.8	0.8
DAIRY PRODUCT PRODUCTION											
BUTTER	TONS	39,075	65,172	90,777	74,722	83,026	85,958	87,618	88,111	89,562	79,915
SKIMMED MILK POWDER	TONS	74,129	127,432	186,418	177,062	194,641	200,357	201,997	198,088	196,556	184,650
CONDENSED MILK	TONS	52,692	75,145	65,048	63,618	55,781	51,446	45,119	43,288	42,456	NA
WHOLE MILK POWDER	TONS	24,701	32,704	34,859	33,692	29,097	21,808	18,378	18,524	18,215	17,965
CHEESE (1)	TONS	54,268	66,088	69,623	84,058	106,427	109,377	117,081	123,729	125,952	124,805
ANNUAL CHANGE											
BUTTER	PERCENT		10.8	8.6	-3.8	2.1	1.8	1.9	0.6	1.6	-10.8
SKIMMED MILK POWDER	PERCENT		11.4	10.0	-1.0	1.9	1.5	0.8	-1.9	-0.8	-6.1
CONDENSED MILK	PERCENT		7.4	-3.5	-0.4	-2.6	-4.0	-12.3	-4.1	-1.9	NA
WHOLE MILK POWDER	PERCENT		5.8	1.6	-0.7	-2.9	-13.4	-15.7	0.8	-1.7	-1.4
CHEESE (1)	PERCENT		4.0	1.3	3.8	4.8	1.4	7.0	5.7	1.8	-0.9

SOURCE: MAFF, STATISTICAL YEARBOOK OF MINISTRY OF AGRICULTURE, FORESTRY AND FISHERIES, TOKYO, VARIOUS ISSUES.

(1) NATURAL FOR DIRECT CONSUMPTION AND PROCESSED.

APPENDIX 4. MILK AND MILK PRODUCT TRADE, JAPAN, 1975-2000

ITEM	UNITS	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
EXPORTS											
FISCAL YEAR											
RAW MILK	TONS	NA	NA	NA	10	NA	NA	NA	NA	NA	NA
BUTTER	TONS	190	50	1	7	NA	NA	NA	NA	NA	NA
SKIM MILK POWDER	TONS	68	0	0	2	NA	NA	NA	NA	NA	NA
CHEESE	TONS	6	3	13	33	NA	NA	NA	NA	NA	NA
OTHER	TONS	6,137	13,920	11,663	10,309	NA	NA	NA	NA	NA	NA
IMPORTS											
FISCAL YEAR											
RAW MILK	TONS	0	0	0	0	0	0	0	0	0	0
BUTTER	TONS	NA	NA	NA	9,130	566	714	687	560	470	472
SKIM MILK POWDER											
SCHOOL LUNCH	TONS	NA	NA	NA	6,245	4,245	4,615	4,066	3,783	3,904	3,592
FEEDING	TONS	NA	NA	NA	55,001	41,984	33,862	38,122	32,099	32,619	33,232
OTHER	TONS	NA	NA	NA	26,555	40,761	35,276	31,688	19,849	20,523	18,964
TOTAL	TONS	NA	NA	NA	87,801	86,990	73,753	73,876	55,731	56,946	55,788
CHEESE											
NATURAL	TONS	NA	NA	NA	111,525	154,954	163,911	167,867	176,862	184,543	202,279
PROCESSED	TONS	NA	NA	NA	2,010	4,391	4,455	4,787	5,655	5,884	6,868
TOTAL	TONS	NA	NA	NA	113,535	159,345	168,366	172,654	182,517	190,427	209,147
CONDENSED MILK	TONS	NA	NA	NA	184	699	801	870	1,504	1,576	1,522
OTHER MILK POWDER	TONS	NA	NA	NA	32,070	35,295	37,361	43,148	40,308	45,669	46,183
LACTOSE	TONS	NA	NA	NA	80,862	87,070	90,083	96,160	89,149	92,725	95,400
PREP CONT COCOA	TONS	NA	NA	NA	35,817	38,783	40,809	41,140	41,780	42,589	46,029
PREP EDIBLE FATS	TONS	NA	NA	NA	21,295	26,424	28,064	27,054	26,042	26,507	28,602
CASEIN	TONS	NA	NA	NA	21,933	22,722	18,428	18,878	18,123	18,505	23,800
CALENDAR YEAR											
RAW MILK	TONS	0	0	0	0	0	0	0	0	0	NA
BUTTER	TONS	2,202	1,860	1,703	7,033	2,054	652	690	565	548	NA
SKIM MILK POWDER											
SCHOOL LUNCH	TONS	13,297	9,933	9,385	5,955	4,846	4,520	4,281	3,942	3,771	NA
FEEDING	TONS	22,374	79,476	76,474	57,027	46,394	37,214	39,169	35,365	34,852	NA
OTHER	TONS	8,435	12,204	18,501	17,738	52,066	33,244	30,192	17,776	17,843	NA
TOTAL	TONS	44,106	101,613	104,360	80,720	103,306	74,978	73,642	57,083	56,466	NA
CHEESE											
NATURAL	TONS	48,438	74,488	81,593	106,193	153,156	159,513	166,926	178,120	180,964	NA
PROCESSED	TONS	286	175	44	1,700	3,987	4,648	4,481	5,327	5,940	NA
TOTAL	TONS	48,724	74,663	81,637	107,893	157,143	164,161	171,407	183,447	186,904	NA
CONDENSED MILK	TONS	1,157	634	441	295	188	692	856	1,181	1,618	NA
OTHER MILK POWDER	TONS										
LACTOSE	TONS	50,374	61,190	71,839	80,499	85,895	89,125	95,587	89,996	91,649	NA
PREP CONT COCOA	TONS	17,285	19,823	28,641	34,776	38,551	40,068	41,027	40,610	42,277	NA
PREP EDIBLE FATS	TONS	2,078	17,008	16,344	20,035	27,404	26,603	27,801	26,098	26,787	NA
CASEIN	TONS	9,575	22,265	24,440	21,146	22,836	19,645	18,915	17,479	18,999	NA

SOURCE: FISCAL YEAR FROM MINISTRY OF FINANCE, JAPAN EXPORTS AND IMPORTS; CALENDAR YEAR FROM JAPAN DAIRY COUNCIL.

APPENDIX 5. CHEESE PRODUCTION, TRADE AND CONSUMPTION, JAPAN, 1975-2000

ITEM	UNITS	FISCAL YEAR, APRIL OF YEAR SHOWN THROUGH MARCH OF FOLLOWING YEAR									
		1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
CHEESE CONSUMPTION											
NATURAL, DIRECT CONS	TONS	9,332	28,059	45,202	77,428	105,410	114,315	114,514	119,493	112,858	142,531
PROCESSED	TONS	54,011	63,991	63,808	75,897	99,128	102,108	108,056	114,557	115,859	117,045
TOTAL	TONS	63,343	92,050	109,010	153,325	204,538	216,423	222,570	234,050	228,717	259,576
ANNUAL CHANGE											
NATURAL, DIRECT CONS	PERCENT		24.6	12.7	11.4	6.4	4.1	0.2	4.3	-5.6	11.5
PROCESSED	PERCENT		3.4	-0.1	3.5	5.5	1.5	5.8	6.0	1.1	1.0
TOTAL	PERCENT		7.8	4.3	7.1	5.9	2.9	2.8	5.2	-2.3	6.5
PROPORTION OF THE TOTAL											
NATURAL, DIRECT CONS	PERCENT	15	30	41	50	52	53	51	51	49	55
PROCESSED	PERCENT	85	70	59	50	48	47	49	49	51	45
TOTAL	PERCENT	100	100	100	100	100	100	100	100	100	100
CHEESE SUPPLY											
PRODUCTION	TONS	15,445	20,678	29,464	39,704	49,582	52,512	54,730	57,188	59,174	57,279
IMPORTS (1)	TONS	47,898	71,372	79,546	111,629	154,956	163,911	167,867	176,862	184,543	202,297
TOTAL	TONS	63,343	92,050	109,010	153,325	204,538	216,423	222,597	234,050	243,717	259,576
ANNUAL CHANGE											
DOMESTIC PRODUCTION	PERCENT		6.0	9.3	6.1	4.5	2.9	4.2	4.5	3.5	-3.2
IMPORTS (2)	PERCENT		8.3	2.7	7.0	6.8	2.8	2.4	5.4	4.3	9.6
TOTAL	PERCENT		7.8	4.3	7.1	5.9	2.9	2.9	5.1	4.1	6.5
CHEESE FROM DOMESTIC MILK											
NATURAL, DIRECT CONS	TONS	257	2,264	5,856	10,170	11,690	11,723	13,812	14,827	15,977	14,628
PROCESSED	TONS	9,401	10,089	13,840	18,245	19,049	21,438	20,378	20,093	20,537	19,041
TOTAL	TONS	9,658	12,353	19,696	28,415	30,739	33,161	34,190	34,920	36,514	33,669
ANNUAL CHANGE											
NATURAL, DIRECT CONS	PERCENT		54.5	26.8	11.7	2.8	0.1	17.8	7.3	7.8	-8.4
PROCESSED	PERCENT		1.4	8.2	5.7	0.9	6.1	-4.9	-1.4	2.2	-7.3
TOTAL	PERCENT		5.0	12.4	7.6	1.6	3.9	3.1	2.1	4.6	-7.8
IMPORTED CHEESE											
NATURAL, DIRECT CONS	TONS	9,075	25,795	39,346	67,258	93,720	102,592	100,729	104,666	111,881	127,903
NATURAL FOR PROCESSING	TONS	38,823	45,410	40,200	44,371	61,236	61,319	67,138	72,196	72,662	74,394
PROCESSED	TONS	0	167	41	2,010	4,391	4,455	4,787	5,655	5,884	6,868
TOTAL	TONS	47,898	71,372	79,587	113,639	159,347	168,366	172,654	182,517	190,427	209,165
ANNUAL CHANGE											
NATURAL, DIRECT CONS	PERCENT		23.2	11.1	11.3	6.9	4.6	-1.8	3.9	6.9	14.3
NATURAL FOR PROCESSING	PERCENT		3.2	-3.0	2.0	6.7	0.1	9.5	7.5	0.6	2.4
PROCESSED	PERCENT		NA	-29.6	117.8	16.9	0.7	7.5	18.1	4.0	16.7
TOTAL	PERCENT		8.3	2.8	7.4	7.0	2.8	2.5	5.7	4.3	9.8

SOURCE: SEINYOU JYUYOU KAKUDAI JITSUMU HANDBOOK (RAW MILK DEMAND EXPANSION BUSINESS), CHUO RAKUNOU (Japan DAIRY COUNCIL) MARCH 2001 AND PREVIOUS ISSUES.

APPENDIX 6. NUMBER OF DAIRY FARMS, JAPAN, 1975-2001

ITEM	UNITS	AS OF FEBRUARY 1									
		1975	1980	1984	1989	1994	1996	1997	1998	1999	2000
NUMBER OF DAIRY FARMS											
1-9 HEAD	1,000	91.2	44.4	30.2	17.4	8.2	5.8	5.2	4.2	4.0	NA
10-14 HEAD	1,000	18.5	13.0	11.5	8.3	4.6	3.8	3.4	3.1	2.9	NA
15-19 HEAD	1,000	12.2	9.9	8.8	7.0	4.0	3.5	3.2	3.1	2.9	NA
20-29 HEAD	1,000	11.5	13.5	12.8	11.6	8.3	7.2	6.6	6.2	5.8	NA
MORE THAN 30 HEAD	1,000	4.9	15.1	17.6	18.3	20.7	20.0	19.8	19.4	18.7	NA
HEIFERS ONLY	1,000	20.5	10.0	6.5	4.1	1.5	1.0	0.9	1.0	0.8	NA
TOTAL	1,000	158.8	105.9	87.4	66.7	47.3	41.3	39.1	37.0	35.1	NA
PROPORTION OF DAIRY FARMS											
1-9 HEAD	PERCENT	57.4	41.9	34.6	26.1	17.3	14.0	13.3	11.4	11.4	NA
10-14 HEAD	PERCENT	11.6	12.3	13.2	12.4	9.7	9.2	8.7	8.4	8.3	NA
15-19 HEAD	PERCENT	7.7	9.3	10.1	10.5	8.5	8.5	8.2	8.4	8.3	NA
20-29 HEAD	PERCENT	7.2	12.7	14.6	17.4	17.5	17.4	16.9	16.8	16.5	NA
MORE THAN 30 HEAD	PERCENT	3.1	14.3	20.1	27.4	43.8	48.4	50.6	52.4	53.3	NA
HEIFERS ONLY	PERCENT	12.9	9.4	7.4	6.1	3.2	2.4	2.3	2.7	2.3	NA
TOTAL	PERCENT	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	NA
ANNUAL RATE OF CHANGE											
1-9 HEAD	PERCENT		-13.4	-9.2	-10.4	-14.0	-15.9	-10.3	-19.2	-4.8	NA
10-14 HEAD	PERCENT		-6.8	-3.0	-6.3	-11.1	-9.1	-10.5	-8.8	-6.5	NA
15-19 HEAD	PERCENT		-4.1	-2.9	-4.5	-10.6	-6.5	-8.6	-3.1	-6.5	NA
20-29 HEAD	PERCENT		3.3	-1.3	-1.9	-6.5	-6.9	-8.3	-6.1	-6.5	NA
MORE THAN 30 HEAD	PERCENT		25.2	3.9	0.8	2.5	-1.7	-1.0	-2.0	-3.6	NA
HEIFERS ONLY	PERCENT		-13.4	-10.2	-8.8	-18.2	-18.4	-10.0	11.1	-20.0	NA
TOTAL	PERCENT		-7.8	-4.7	-5.3	-6.6	-6.6	-5.3	-5.4	-5.1	NA

SOURCE: DAIRY FACTS AND FIGURES IN JAPAN NOVEMBER 2000 AND EARLIER ISSUES, JAPAN DAIRY COUNCIL

APPENDIX 7. NUMBER OF DAIRY FARMS BY HERD SIZE, UNITED STATES, 1993 AND 2000

NUMBER OF HEAD	1993		2000		ANNUAL CHANGE, 1993-2000
	NUMBER	PERCENT	INVENTORY	PERCENT	PERCENT
1-29 HEAD	58,630	37.3	31,110	29.6	-5.6
30-49 HEAD	34,810	22.2	21,910	20.8	-4.1
50-99 HEAD	42,110	26.8	31,360	29.8	-2.6
100-199	14,630	9.3	12,865	12.2	-1.2
200+	6,970	4.4	NA	NA	NA
200-499	NA	NA	5,325	5.1	NA
500+	NA	NA	2,680	2.5	NA
500-999	NA	NA	1,700	1.6	NA
1,000-1,999	NA	NA	700	0.7	NA
2000+	NA	NA	280	0.3	NA
TOTAL	157,150	100.0	105,250	100.0	-3.6

SOURCE: ONLINE WWW.NASS.USDA.GOV

APPENDIX 8. CATTLE INVENTORY ON DAIRY FARMS, RAW MILK PRODUCTION AND YIELD PER COW, JAPAN, 1975-2001

ITEM	UNITS	1975	1980	1985	1990	1995	1996	1997	1998	1999	2000
TOTAL COW INVENTORY, AUGUST 1											
NUMBER	1,000 HEAD	1,122	1,310	1,329	1,294	1,214	1,222	1,200	1,193	1,174	1,148
ANNUAL RATE OF CHANGE	PERCENT		3.2	0.4	-0.5	-1.3	0.3	-1.8	-0.6	-1.6	-2.2
COWS IN LACTATION, AUGUST 1											
NUMBER	1,000 HEAD	NA	1,114	1,133	1,110	1,021	1,040	1,028	1,018	1,000	977
ANNUAL RATE OF CHANGE	PERCENT			0.4	-0.4	-1.7	0.9	-1.2	-1.0	-1.8	-2.3
RAW MILK PRODUCTION											
FISCAL YEAR (1)	1,000 TONS	5,006	6,498	7,436	8,203	8,467	8,659	8,629	8,543	8,514	8,416
CALENDAR YEAR	1,000 TONS	4,961	6,502	7,380	7,457	7,335	7,607	8,645	8,572	8,460	8,497
ANNUAL CHANGE											
FISCAL YEAR (1)	PERCENT		5.4	3.4	2.0	0.6	1.1	-0.3	-1.0	-0.3	-1.2
CALENDAR YEAR	PERCENT		5.6	3.2	0.2	-0.3	1.8	13.6	-0.8	-1.3	0.4
FISCAL YEAR PRODUCTION AND FEBRUARY 1 INVENTORY											
YIELD PER TOTAL NUMBER OF COWS IN INVENTORY											
YIELD	KG	4,506	5,033	5,625	6,384	6,980	7,150	7,161	7,184	7,264	7,318
ANNUAL CHANGE	PERCENT		2.2	2.8	2.6	1.8	1.2	0.2	0.3	1.1	0.7
YIELD PER DAIRY COW IN LACTATION											
YIELD	KG	5,502	6,096	6,754	7,695	8,189	8,366	8,361	8,365	8,445	8,614
ANNUAL CHANGE	PERCENT		2.1	2.6	2.6	1.3	1.1	-0.1	0.0	1.0	2.0
CALENDAR YEAR PRODUCTION AND AUGUST 1 INVENTORY											
YIELD PER TOTAL NUMBER OF COWS IN INVENTORY											
YIELD	KG	4,424	4,964	5,553	5,763	6,042	6,225	7,192	7,185	7,206	7,402
ANNUAL CHANGE	PERCENT		2.3	2.8	0.7	1.0	1.5	15.5	-0.1	0.3	2.7
YIELD PER DAIRY COW IN LACTATION											
YIELD	KG	NA	5,837	6,514	6,718	7,184	7,314	8,410	8,420	8,460	8,697
ANNUAL CHANGE	PERCENT		NA	2.8	0.6	1.4	0.9	15.0	0.1	0.5	2.8

SOURCE: MAFF, ONLINE MILK AND MILK PRODUCTS STATISTICS AND ONLINE STATISTICS OF DAIRY PRODUCTS IN JAPAN. www.maff.go.jp