United States Department of Agriculture
Economic Research Service
https://www.ers.usda.gov

United States
Department of
Agriculture

**Economic
Research
Service**

**Commodity
Economics
Division**

Estimates of the Costs of Producing Milk in Seven Major Milk-Producing Countries, 1986

Derek Baker, M.C. Hallberg, Rodolfo Tanjuakio,
Joachim Elterich, Robert L. Beck, and
Carolyn Betts Liebrand

It's Easy To Order Another Copy!

Just dial 1-800-999-6779. Toll free (in the United States and Canada). All other areas please dial 301-725-7937.

Ask for *Estimates of the Costs of Producing Milk in Seven Major Milk-Producing Countries, 1986* (AGES 9056).

The cost is $4.00 per copy. For non-U.S. addresses (including Canada), add 25 percent. Charge your purchase to your VISA or MasterCard, or we can bill you. Or send a check or purchase order (made payable to ERS-NASS) to:

ERS-NASS
P.O. Box 1608
Rockville, MD 20849-1608.

We'll fill your order by first-class mail.

Estimates of the Costs of Producing Milk in Seven Major Milk-Producing Countries, 1986. By Derek Baker, M.C. Hallberg, Rodolfo Tanjuakio, Joachim Elterich, Robert L. Beck, and Carolyn Betts Liebrand. Commodity Economics Division, Economic Research Service, U.S. Department of Agriculture. Staff Report No. AGES 9056.

Abstract

Milk production costs per cwt in the United States and the Netherlands are quite similar and are in the middle of the range of costs estimated for the seven countries included in this analysis. New Zealand is the lowest cost milk-producing country in the world while costs in France and West Germany are substantially higher than in the United States. Costs in Ireland are somewhat lower than in the United States, while milk production costs in Canada are also quite high compared with the United States, but significantly lower than in France or West Germany. Although the estimates are subject to error, and in some cases missing information, the estimated totals appear to be useful approximations of relative costs of producing milk in the seven countries included in the analysis.

Keywords: Cost of production, dairy, milk, New Zealand, Germany, France, Canada, Ireland, Netherlands

Washington, DC 20005-4788 August 1990

Contents

Estimates of the Costs of Producing Milk in Seven Major Milk-Producing Countries, 1986

Derek Baker, M.C. Hallberg, Rodolfo Tanjuakio,
Joachim Elterich, Robert L. Beck, and Carolyn Betts Liebrand

Introduction

Liberalization of agricultural trade has received considerable attention from both policymakers and policy analysts in the recent past. Available studies universally project net gains in world welfare from reductions in the level of protection afforded such agricultural sectors as dairy.1/ The extent and distribution of these gains and the associated realignment of prices and physical trade flows can be expected to be guided by the principles of comparative advantage. The basis for such realignments will depend in large part on the relative cost of production in the different trading nations.

It is argued by some that the United States is at a comparative disadvantage in milk production and thus that U.S. milk producers are being protected from foreign competition by a price support program buttressed with import controls. If this is true, then some, if not all, of the manufacturing milk now produced in the United States should more properly be imported from other countries in the form of manufactured products, and U.S. producers should concentrate their resources on production of fluid milk, which cannot so readily be transported across national borders. Such a turn of events would obviously cause a drastic change in the structure of, and in current policy for, the U.S. dairy industry. To examine such issues it is important to have the best possible estimates of relative costs of production and of relative comparative advantages.

The authors are Research Associate, Pennsylvania State University; Professor, Pennsylvania State University; Research Associate, University of Delaware; Professor, University of Delaware; Professor, University of Kentucky; and Economist, Economic Research Service, USDA, respectively.

1/ See Baker, et al. (1988) and Hallberg and Cho (1987) for a comparative summary of the various quantitative models that have been developed with which to assess these consequences, and for a summary of projected results of trade liberalization.

The purpose of this report, then, is to provide as accurate an assessment as possible of the current cost of producing milk in the major milk-producing countries of the world. The countries included in this analysis--Canada, West Germany, France, Ireland, the Netherlands, New Zealand, and the United States--were selected in large part on the basis of data availability, but also because of their current or potential significance to the world's dairy economy. Canada was included because of its proximity to the United States and because of the potential for some dairy product trade between these two countries in subsequent years. Most of the remaining countries included are engaged in significant amounts of trade in dairy products already.

To date there have been only a few attempts to quantify intercountry differences in the costs of producing specific agricultural commodities. Stanton (1984) compared the cost of producing cereals in the United States and selected countries in the European Economic Community (EC). Austin (1981), Hamm and Nott (1986), and Phillips, et al. (1989) compared milk production costs for a limited number of countries. Such efforts must contend with many difficulties. In the first place, there are differences in production systems between countries. Secondly, there is no common basis for cost accounting nor even for specifying the content of the various cost categories. Data of comparable reliability across countries is nearly impossible to obtain. Macroeconomic differences such as capital market structures, land tenure, inflation, and exchange rate dynamics, further complicate the issue.

One should thus be under no illusion that an analysis such as that reported here can lead to precise estimates of costs of production. Further, the ranking of countries on the basis of costs of production will change as relative economic conditions change. For example, the U.S. dollar was much stronger against most Western currencies in 1984-85 than it is today. Consequently, the United States now has a greater cost advantage in milk production over those countries for which the U.S. dollar is weaker than it was in 1984-85. Nevertheless, the analysis reported here is warranted in the sense that it provides a good guide for comparing existing production cost differences among countries. It is in this vein that the current study is undertaken.

Method of Analysis

Following Austin (1981), we define total economic efficiency in production to be the cost of all inputs required to produce one unit of output. Total cost per unit of output, then, is used to gauge the relative efficiency of dairy farms in the different countries. The country with the lowest cost would possess an

absolute, but not necessarily a comparative, advantage over other countries. We assume that competitive behavior characterizes all producers in all countries in this study, and that the influence of government policies can be adequately reflected by adjusting final cost estimates for known subsidies and taxes that serve to distort either the input or output markets.

All costs of production were obtained from secondary sources identified in the next section of this paper, or were derived from secondary sources. The data so obtained are by nature highly aggregated and thus are suited only to an analysis that seeks costs for the "typical" dairy farm in the various countries.

A standard procedure for categorizing and estimating costs of production was developed and followed throughout. In addition to financial detail, the analysis attempted to incorporate all available information on management, stocking rates, herd replacements, and other variables so as to express broad average results in terms meaningful to "typical" dairy farm operations. This "budget" approach frequently required data adjustments to ensure agreement between basic aggregates and derived values for a given country.

All value data were adjusted to reflect costs expressed in 1986 U.S. dollars using average dollar exchange rates for 1986 as reported in the International Monetary Fund's International Statistics, 1989. Costs from years other than 1986 were inflated using Consumer Price Index (CPI) estimates from the Organization of Economic Cooperation and Development (1988).

Following Austin (1981), net farm subsidies can be viewed as a cost of producing milk. To the extent that these represent (in part, at least) direct subsidies for farm inputs (for example, fertilizer or credit) used in producing milk, it is clear they should be charged as a direct cost of production. To the extent that these subsidies encourage an industry to produce less efficiently than it otherwise would, they should also be charged as a cost to society of producing milk. We report estimated net subsidies as a separate item in the tabulations below so the reader will have the benefit of the current best estimate of the magnitude of these quantities, and thus can determine how addition of net subsidies would affect the country-by-country rankings of total costs. Producer subsidy equivalents (PSE's) as reported by Webb et al. (1989), were taken as the current best estimate of net farm subsidies.

Production costs are divided into the following five categories: variable costs, fixed costs, subsidies less taxes, depreciation of machinery and equipment, and returns to land and building capital. Variable costs are further subdivided into feed, labor, and other costs. Feed costs include costs for concentrates,

forage, hay, silage, haylage, and grazing. Labor costs consist of contract labor, family labor, full-time and part-time labor, and other monetary benefits paid hired workers. Other variable costs include those associated with livestock breeding, veterinary services, livestock marketing, milk marketing (cooperative membership fees, dairy promotion assessments, and so forth), operating interest, storage, utilities, repair and maintenance of equipment, machinery hire, freight, soil conservation, and fertilizers and lime.

Fixed costs are costs directly associated with milk production and do not vary with milk output in a given production period. Included here are administrative costs, costs of licences and fees, and cost of debt servicing.

Subsidies less taxes capture the costs of milk production levied against the taxpayer. The latter were estimated by multiplying the PSE (percentage) times milk revenue on farms for which the data are intended to be representative.

Capital replacement or asset depreciation is taken as a cost of production and is estimated by depreciation rates readily available or at an assumed rate of 10 percent.

Following Austin (1981), returns to capital were calculated as 2.6 percent of reported or estimated capital investment. In general, only land and building assets were considered here. For Canada, West Germany, France, Ireland, and the Netherlands, however, an estimated value of the milk quota was also included.

Milk quotas give the quota holder the "right" to produce milk. Assuming it is profitable to produce milk at the quota level, these "rights" accumulate value (economic rents) and must be treated as a fixed (nondepreciable) asset. But since economic structures and policy decisions affecting the dairy industry in the various countries differ, quota values should also be expected to differ from country to country.

Unfortunately, information on quota values is quite sparse and of varying reliability. In Canada, there is a reasonably well-established market on which milk quotas trade, and this market has had time to mature. In the EC, on the other hand, quotas were introduced only in 1984, and quota administration and quota transferability schemes not only differ from country to country, but have evolved over time rather than being put in place once and for all in 1984. Further, in some cases (notably Ireland), total milk production was below quota until 1987 so that very little need for a quota market existed until that time. Finally, EC milk quotas are generally transferable only when the farm to which they are assigned is transferred, so it is difficult to separate the value of the quota from the value of the farm.

Nevertheless, limited information is available on which to base estimates of the value of milk quotas for several EC countries and for Canada from Conway (1989), De Boer and Krijger (1989), Hamm and Nott (1987), Hanf (1989), and the UK Ministry of Agriculture, Fisheries, and Food (1988). The estimates were generally reported on the basis of value (in local currency) per kilogram or per liter of milk. For the EC countries, these values were discounted by 25 percent in view of the thinness of the market on which they were traded, and in view of the fact that these transactions were probably not representative of the "typical" transaction throughout the country. The resulting estimates were then converted to U.S. dollars per pound of milk, and finally multiplied by the yields per cow (table 1) to get a first approximation of the value of the quota in U.S. dollars per cow. The resulting quota values were $1,707 for Canada, $1,508 for West Germany, $954 for Ireland, and $2,244 for the Netherlands. Since no estimates were available for France, we took the estimated value of milk quotas in France to be the same as in West Germany.

A weighted average price received by farmers for milk was calculated for each country except for New Zealand and Ireland. In those two countries, the producer price for manufacturing milk was used since the "typical" dairy farm in these two countries was a farm producing "manufacturing milk." Reported prices received are assumed to be farm level prices net of any transportation cost differentials.

Income data on farm enterprises other than milk was generally not available. The only farm income reported by this study, then, is that derived from the sale of milk. This approach ignores beef production and livestock sales, which are universally byproducts of milk production. Since the relative importance of farm operations other than milk production differs somewhat between countries, intercountry revenue comparisons shown here are somewhat distorted.

Canada

Milk production in Canada differs very little from that in the United States. Canada's tradeable quota system imposes a high capital requirement on the entrant into milk production, but otherwise the production systems in the two countries are quite comparable.

The data for Canada come from three sources: Hamm and Nott (1987), an unpublished report from Agriculture Canada (Huost, 1988), and Phillips, et al. (1989). The study by Hamm and Nott contains much information on the capital structure of Canadian dairy farms and the report by Huost contains information on management and physical quantities. Huost surveyed six Canadian

provinces and reported mean values. The cost information reported here is weighted most heavily toward the provinces of Ontario and Quebec, and represents an amalgamation of much of Huost's survey for the cost data, and Hamm and Notts' study for capital information. Little information was available, however, on fixed costs.

West Germany, France, and the Netherlands

The data for these countries come from unpublished data collected and supplied by Joachim Elterich and Rodolfo Tanjuakio of the University of Delaware and obtained from the West German Ministry of Agriculture. These data were supplemented with information on the Netherlands from Phillips et al. (1989). Feed costs were not broken out by feed categories, but total feed costs appear to be quite reasonable. Labor costs appear to be quite low and may reflect the fact that part-time and/or family labor were undervalued or underreported. The price received by farmers for milk was estimated from the above sources and, in the case of France, adjusted based on the data reported in Herlihy et al. (1989).

Ireland

Dairy production in Ireland involves greater use of forage than does dairy production in the United States, but cows in Ireland are housed to a greater degree than are those in New Zealand. Thus, while milk production in Ireland has similarities to milk production in New Zealand, it is nevertheless quite comparable to that in most of the temperate world.

The data for Ireland were obtained from Heavey et al. (1987) and Fingleton (1989). The surveys on which these studies are based categorized the farm population according to production sector, geographic region, farm income, and herd size. The data were lacking in detail on operating costs and fixed costs. As with most European data used here, labor costs seemed quite low. Estimates of fixed costs for Ireland drew on data supplied by Elterich and Tanjuakio, but were adjusted to reflect what was felt to more nearly characterize fixed capital requirements in Ireland.

New Zealand

Milk production in New Zealand is for the most part pasture-based and hence subject to a pronounced seasonal production pattern. Relatively small amounts of concentrates are fed. Herds tend to be relatively large, production per cow low, and building costs minimal. The New Zealand dairy sector is dominated by exports of

manufactured dairy products, with "town" milk (fluid milk) being a separate industry involving different farms with their own cost and management structures. The "town" milk industry constitutes less than 10 percent of the dairy farms, and considerably less in terms of cow numbers and farm acreage. The data reported here for New Zealand is reflective only of the manufacturing milk sector.

The data on production costs for New Zealand were quite complete and are derived from reports obtained from the New Zealand Dairy Board (1986). These data represent costs for the "typical" owner-operated herd in New Zealand producing manufacturing milk, and deriving at least 75 percent of farm income from the sale of milk. The survey data represent averages for the three major production regions in the country and are to be interpreted as "typical" values for farms producing milk for manufactured products for the export market.

The United States

Costs of producing milk in the United States represent an amalgamation of costs reported by the U.S. Department of Agriculture (1989), with structural details based on Hamm and Nott (1986). These sources reflect the cost of milk production across the major milk-producing regions of the Upper Midwest. The farm size estimate was derived from trends in stocking rate and cow numbers reported by the U.S. Department of Agriculture (1988).

Total costs per cow reported here are quite close to those given by the U.S. Department of Agriculture (1989) for the Upper Midwest although different cost categories were used. Milk output per cow (table 1) for the United States, however, is about 20 percent higher than the average output per cow reported by USDA.

Dairy production in the United States is, of course, quite diverse. The two major dairy regions of the country--the Upper Midwest and the Northeast--have very similar production structures and costs per hundredweight of milk produced. In the Pacific region, a third major dairy production region in the United States, feed costs are higher since much of the feed must be shipped in, more roughage is fed, and building costs are lower because of the warmer climate. Here total costs per cow tend to be about 10 percent higher than in the Upper Midwest. Nevertheless, cost per hundredweight of milk produced is about 10 percent lower than in the Upper Midwest since output per cow in the Pacific region is substantially higher than in the Upper Midwest.

Table 1--Comparison of structure of dairy farms and estimated costs of producing milk in selected countries, 1986

Item of comparison	Unit	Canada	West Germany	France	Ireland	The Netherlands	New Zealand	United States
Farm size:								
Number of cows	No.	45	28	20	33	55	137	45
Stocking units a/	No.	75	54	26	61	92	182	69
Area	acres	319	84	79	102	65	167	241
Capital b/	dol.	148,038	118,580	66,698	63,482	175,488	26,219	65,700
Per cow	dol.	3,290	4,235	3,335	1,924	3,191	191	1,460
Per acre	dol.	464	1,412	844	622	2,700	157	273
Labor units c/	No.	2.0	1.8	1.6	1.7	1.6	2.0	3.0
Milk revenue	dol.	80,928	35,032	19,383	17,087	80,508	44,372	83,825
Price received by farmers:	dol/cwt	14.05	12.87	10.25	6.03	12.00	4.73	12.50
Milk production:								
Total	cwt	5,760	2,722	1,891	2,953	6,709	9,381	6,706
Per cow	lb	12,800	9,721	9,455	8,948	12,198	6,847	14,902
Per acre	lb	1,806	3,240	2,394	2,895	10,322	5,617	2,783
Variable costs:								
Feed	dol.	24,613	15,403	8,317	3,041	26,325	3,806	29,188
Per hundredweight	dol.	4.27	5.66	4.40	1.03	3.92	0.41	4.35
Per cow	dol.	547	550	416	92	479	28	649
Per acre	dol.	77	183	105	30	405	23	121
Labor	dol.	7,909	1,849	2,888	895	1,804	3,099	5,958
Per hundredweight	dol.	1.37	0.68	1.53	0.30	0.27	0.33	0.89
Per cow	dol.	176	66	144	27	33	23	132
Per acre	dol.	25	22	37	9	28	19	25
Other variable:								
Total	dol.	36,653	21,672	15,579	6,933	30,813	26,362	12,892
Per hundredweight	dol.	6.36	7.96	8.24	2.35	4.59	2.81	1.92
Per cow	dol.	815	774	779	210	560	192	286
Per acre	dol.	115	258	197	68	474	158	53
Total variable:								
Total	dol.	69,175	38,924	26,784	10,869	58,942	33,267	48,038
Per hundredweight	dol.	12.01	14.30	14.16	3.68	8.79	3.55	7.16
Per cow	dol.	1,537	1,390	1,339	329	1,072	243	1,068
Per acre	dol.	217	463	339	107	907	199	199

Table 1--Comparison of structure of dairy farms and estimated costs of producing milk in selected countries, 1986--continued

Item of comparison	Unit	Canada	West Germany	France	Ireland	The Netherlands	New Zealand	United States
Fixed costs:								
Total	dol.	4,200	4,570	2,130	4,224	2,194	3,145	13,576
Per hundredweight	dol.	0.73	1.68	1.13	1.43	0.33	0.34	2.02
Per cow	dol.	93	163	107	128	40	23	302
Per acre	dol.	13	54	27	41	34	19	56
Depreciation:								
Total	dol.	7,914	8,483	4,059	3,555	5,785	4,242	7,299
Per hundredweight	dol.	1.37	3.12	2.15	1.20	0.86	0.45	1.09
Per cow	dol.	176	303	203	108	105	31	162
Per acre	dol.	25	101	51	35	89	25	30
Returns to capital:								
Total	dol.	3,849	3,083	1,734	1,651	4,563	682	1,708
Per hundredweight	dol.	0.67	1.13	0.92	0.56	0.68	0.07	0.25
Per cow	dol.	86	110	87	50	83	5	38
Per acre	dol.	12	37	22	16	70	4	7
Total costs:								
Total	dol.	85,138	55,060	34,708	20,299	71,483	41,336	70,621
Per hundredweight	dol.	14.78	20.23	18.35	6.87	10.65	4.41	10.53
Per cow	dol.	1,892	1,966	1,735	615	1,300	302	1,569
Per acre	dol.	267	655	439	199	1,100	248	293
Subsidies less taxes: d/								
Total	dol.	57,459	22,771	12,599	11,574	52,330	5,325	51,972
Per hundredweight	dol.	9.98	8.37	6.66	3.92	7.80	0.57	7.75
Per cow	dol.	1,277	813	630	351	951	39	1,155
Per acre	dol.	180	271	159	113	805	32	216

a/ The standard EC system of one stock unit equals one mature cow, four calves, etc.

b/ Capital consists of the ending value of farm buildings and machinery plus the value of the dairy quota where applicable.

c/ One labor unit equals one adult supplying one full year of labor.

d/ Source: Webb, Alan J., Michael Lopez, and Renata Penn. "Estimates of Producer and Consumer Subsidy Equivalents." Agriculture and Trade Analysis Division, Economic Research Service, USDA. Statistical Bulletin No. 803. April 1990.

Results

A comparative summary of the structure of dairy production and costs of producing milk is given in table 1. In terms of total milk revenue generated, Canadian, Dutch, and U.S. dairy farms are of similar size, and are the largest of any in this study. Those in France and Ireland are the smallest. New Zealand dairy farms have the largest herds, followed by those in the United States, Canada, and the Netherlands, each with about one-third the New Zealand cow numbers. Canadian dairy farms are the largest in terms of land area, followed by U.S. dairy farms. New Zealand ranks third on the basis of dairy farm area with about one-third the acreage of the Canadian farms.

West German and French dairy farms have the smallest herds with around 20 cows, less than half that of Canada or the United States. West German and Dutch dairy farms have the smallest acreages in this study, about one-sixth that of the United States. New Zealand dairy farms have the highest total milk production at about four times that of French, German, and Irish dairy farms.

Dairy farms in Ireland, France, and the United States have similar total capital requirements. Those in West Germany, Canada, and the Netherlands have substantially greater total capital requirements. Canadian, French, and Dutch dairy farms have similar capital requirements per cow, but the higher stocking rates of Dutch dairy farms requires greater total and per acre capital outlay.

New Zealand cows are the least productive in terms of milk output per cow by a significant margin--at about half that of the United States where cows are the most productive. Canadian and Dutch cows produce at about 80 percent of the level of U.S. cows, and the remaining European cows produce at 50-60 percent of the level of U.S. cows. The intensive Dutch dairy farms have by far the highest per acre productivity; New Zealand is second at only half the Dutch figure. The remaining countries' output per acre is about one-quarter that of the Netherlands.

Most interesting are the differing results from the input/output perspective. Expenditures on feed per hundredweight of milk produced and per cow are lowest in New Zealand and Ireland as would be expected in countries with a "grass-based" dairy enterprise. Feed costs per hundredweight of milk are similar between Canada and the United States, but 20 percent higher per cow and 60 percent higher per acre in the United States than in Canada. Similarly, Dutch, Canadian, and U.S. farms have similar feed costs per unit of milk, but Dutch feed costs per acre are 3.3 times those in the United States. Total feed costs per hundredweight of milk range from $0.41 in New Zealand to $5.66 in West Germany.

Unfortunately, little can be concluded from the labor costs reported here because of the apparently low labor input reported for the European countries. The distinction between paid and unpaid labor is a probable basis for this confusion. Other variable costs are highest per cow and per hundredweight of milk produced in West Germany, Canada, and France. Considerable variation between countries is observed in this category.

The Netherlands and the United States have similar levels of total variable cost per cow at around $1,000. French, West German, and Canadian variable costs per cow are 34, 39, and 54 percent above this level, while New Zealand variable costs are the lowest at $243 per cow. At $3.55 per hundredweight of milk, New Zealand's total variable cost is the lowest--half the U.S. figure. Interestingly, U.S. and New Zealand costs are similar per acre, but U.S. per cow costs are five times those in New Zealand.

New Zealand has the lowest fixed costs per cow, while the United States has the highest. Fixed costs are quite high in Europe, as might be expected.

Depreciation expenditures and returns to capital are also quite variable across countries, but appear to be reasonable in view of general knowledge of capital markets and asset values in these countries. It is notable that for West Germany and the Netherlands, and for Canada, France, Ireland, New Zealand, and the United States, depreciation expense per acre is quite similar. This reflects similar intensities of capital usage in those two groups of countries.

Subsidies less taxes on a per cow basis are lowest in New Zealand and highest in Canada. Canadian subsidies per cow are about 125 percent of those in the United States and the Netherlands, which are similar at $960-$1,200/cow. Subsidies per acre are extremely high in the Netherlands (at over $800), with West Germany next at about 34 percent of this level.

The distribution of total economic costs by major cost categories is shown in table 2. Among other things, this table highlights the fact that milk production costs are dominated by variable costs, feed costs in particular, and costs associated with breeding, crop production, and animal health.

Conclusions

Although the estimates generated here are subject to error and in some cases desired information is missing, the estimated totals appear to be useful approximations of relative costs of producing milk in the seven countries included in this analysis. Table 3

Table 2--Distribution of estimated costs of producing milk in selected countries, 1986

Cost category	Canada	West Germany	France	Ireland	The Netherlands	New Zealand	United States
				Percent			
Feed	28.9	28.0	24.0	15.0	36.8	9.2	41.3
Labor	9.3	3.4	8.3	4.4	2.5	7.5	8.4
Other variable	43.1	39.4	44.9	34.2	43.1	63.8	18.3
Total variable	81.3	70.8	77.2	53.6	82.4	80.5	68.0
Fixed	4.9	8.3	6.1	20.8	3.1	7.6	19.3
Depreciation	9.3	15.3	11.7	17.5	8.1	10.2	10.3
Returns to capital	4.5	5.6	5.0	8.1	6.4	1.7	2.4
Total costs 1/	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1/ Excluding subsidies less taxes.

Table 3--Ranking of countries on the basis of cost of producing milk 1/

Country	Cost per cwt			Cost per cow			Cost per acre		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
					Index				
New Zealand	42	47	27	19	29	5	85	73	104
Ireland	65	71	--	39	42	--	68	69	--
United States	100	100	100	100	100	100	100	100	100
Netherlands	101	106	89	83	106	72	375	368	708
Canada	140	--	112	121	--	110	91	--	150
France	174	88	--	111	74	--	150	126	--
West Germany	192	95	--	125	80	--	224	444	--

-- = not available

1/ Costs of production expressed as a percentage of cost of production in the United States. In this tabulation, the column labeled (a) is based on the current study, the column labeled (b) is based on Austin (1981), and the column labeled (c) is based on Phillips et al. (1989).

Column (a) is based on costs excluding subsidies less taxes while column (b) is based on costs including subsidies less taxes.

suggests that on either a per hundredweight or per cow basis, New Zealand is the lowest cost milk-producing country in the world. New Zealand's cost advantage in milk production comes about because of its relatively low feed costs and low capital requirements in dairy production. Ireland is next in line with per unit costs significantly lower than in the United States. The cost of producing milk in the Netherlands is comparable with that in the United States on either a per hundredweight or a per cow basis. These two countries rank next to New Zealand and Ireland in cost per hundredweight of milk produced and in cost per cow. Milk production costs in France and West Germany are much higher than in the United States. The high costs in France and West Germany are due to relatively high depreciation charges, and higher still capital charges and variable costs other than feed and labor.

The rankings shown in the columns of table 3 labeled (a) were based on costs exclusive of subsidies less taxes. It should be noted that the relative rankings of the seven countries considered here would not have differed greatly had subsidies less taxes been included as can be verified from the data shown in table 1. When subsidies and taxes are included, however, milk production costs in France and West Germany are much closer to those of the United States, even though still significantly greater.

Our overall judgment is that among the major milk-producing countries in the world, and on a per hundredweight of milk or on a per cow basis, milk production costs are probably highest in France and West Germany and lowest in New Zealand. Milk production costs in Canada are also quite high relative to those in the United States, but significantly lower than in France or West Germany. Milk production costs in the United States and the Netherlands are similar and are in the middle of the range of costs estimated in this study.

There are some significant differences in the estimates derived here from those estimated in previous studies. These differences, however, are generally within a margin of error that could be expected from such cross-country comparisons. No major realignments of countries on the basis of cost comparisons appear to have occurred between the year of applicability of Austin's estimates (1979), for example, and that of the present study (1986), with the exception that costs in France and West Germany appear to have gotten higher relative to those in New Zealand, Ireland, the United States, and the Netherlands. This can most likely not be attributable to exchange rate differences between the different study years, but rather to structural changes in the dairy sectors of France and West Germany.

Another country producing substantial quantities of milk for which cost comparisons would have been desirable is Argentina.

Partial data obtained from two consultants' reports (Asesoramiento y Administracion Campos, and Estudio Cazenave y Asociados) suggests that Argentine milk production costs on "above average" herds in the Buenos Aires area are comparable with those in Ireland if not in New Zealand. Unfortunately, the data available are likely not representative of the majority of dairy herds in Argentina. More important, extremely high inflation rates in Argentina make comparative analyses such as this tenuous at best. For these reasons, we felt the Argentine costs should not be included until more detailed studies become available.

References

Asesoramiento y Administracion Campos. Agricultural Consultants, Buenos Aires, Argentina. 1987. Personal communication.

Austin, Lynn A. "Costs of Milk Production in Seven Major Milk Protein Exporting Countries and the United States." International Economics Division, Economic Research Service, USDA. Staff Report No. AGES810922. September 1981.

Baker, Derek, Milton Hallberg, and David Blandford. "U.S. Agriculture Under Multilateral and Unilateral Trade Liberalization--What the Models Say." Department of Agricultural Economics and Rural Sociology, The Pennsylvania State University. A.E. & R.S. No. 200. January 1989.

Burrell, Alison (ed). Milk Quotas in the European Community. C.A.B. International. Wallingford, Oxon, UK. 1989.

Conway, A. G. "The Exchange Value of Milk Quotas in the Republic of Ireland and Some Future Issues for EC Quota Allocation," in Burrell, op.cit., pps. 101-119.

De Boer, P. and A. Krijger. "The Market for Milk Quotas in the Netherlands with Special Reference to the Correlation Between the Price of Land (with Quota) and the Profit per Hectare in Dairy Farming." in Burrell, op. cit., pps. 120-129.

Estudio Cazenave y Asociados. Ingenieros Agronomos. Agricultural Consultants, Buenos Aires, Argentina. 1987. Personal communication.

Fingleton, W. A. Agriculture and Food Development Authority, Rural Economy Research Centre, Dublin, Ireland. 1989. Personal communication.

Fornandec-Cornego, Jorge, and Joachim Elterich. "Dairy Farms of the Federal Republic of Germany: 1980-85 Summary Tables." University of Delaware Department of Food and Resource Economics, FRE Pamphlet #93. December 1987.

Hallberg, M. C., and Woong-Je Cho. "The World Dairy Market: Policies, Trade Patterns, and Prospects." The Pennsylvania State University, Department of Agricultural Economics and Rural Sociology. A.E. & R.S. 191. August 1987.

Hamm, Larry G., and Sherrill Nott. "The Canadian Milk Quota System: An Analysis and Comparison to the Michigan and U.S. Dairy Industry." Michigan State University. Economic Report No. 489. January 1987.

Hanf, Claus-Hennig. "The Impact of Milk Quotas on Milk Production and Milk Processing in Germany: Some Selected Aspects," in Burrell, op. cit., pps. 62-75.

Heavey, J. F., L. Connolly, and M. Roche. "National Farm Survey, 1986: Provisional Estimates." Rural Economy Research Centre. Information Update Series No. 22. Dublin, Ireland. June 1987.

Herlihy, Michael, Stephen Magiera, Richard Henry, and Kenneth Bailey. "Agricultural Statistics of the European Community, 1960-85." U.S. Dept. Agr., Econ. Res. Serv. SB-770. January 1989.

Huost, Marcel. Policy Branch, Agriculture Canada. 1988. Personal communication.

International Monetary Fund. International Financial Statistics, Washington, DC, 1989.

Ministry of Agriculture, Fisheries, and Food. "Milk Production Before and After Quotas." Her Majesty's Stationery Office. London. July 1988.

New Zealand Dairy Board. "An Economic Survey of Factory Supply Dairy Farms in New Zealand, 1985-86." ISSN 0111-1086. Wellington. December 1986.

Organization for Economic Co-Operation and Development. Main Economic Indicators. Paris. December 1988.

Phillips, Rick, James White, and Peter Stonehouse. "The International Competitive Status of Canada's Milk Production Sector." Agriculture Canada. Working Paper 1/89. January 1989.

U.S. Department of Agriculture. Dairy Situation and Outlook. Economic Research Service. DS-414. April 1988.

U.S. Department of Agriculture. Economic Indicators of the Farm Sector: Costs of Production, 1987. Economic Research Service. ECIFS 7-3. February 1989.

Webb, Alan J., Michael Lopez, and Renata Penn. Estimates of Producer and Consumer Subsidy Equivalents. Agriculture and Trade Analysis Division, Economic Research Service, USDA. Statistical Bulletin No. 803. April 1990.

☆U.S. Government Printing Office : 1990 - 261-455/20757