

DAIRY INDUSTRY REVIEW

In place of the usual *Bulletin* dairy season review which examines in some detail the developments of the latest season, especially those affecting exports, this review will briefly describe the main economic aspects of the New Zealand dairy industry and review developments in a longer time frame of the past twenty years or so. The many significant changes and developments within the dairy industry and its markets during this period are described not so much for their historical interest but more to illustrate the influences which have shaped the structure of the industry as it is today and will be for the immediate future. This brief survey is aimed at readers who do not have an expert knowledge of the industry.

NEW ZEALAND MILK PRODUCTION

New Zealand has a significant international comparative advantage in the production of milk which derives from the main natural resource, temperate climatic conditions well suited to pasture production, and the use of management systems developed to maximise the production of grass and utilise it most efficiently. Dairy production is largely concentrated in those areas of the North Island where mild climatic conditions, generally free from extremes of temperature and with adequate rainfall provide a long growing season for pasture. Production of milk for manufacture closely follows the seasonal pattern of grass production, a rising phase from spring (August) through to a peak normally in November-December, falling from that period through to May (early winter) when most cows are dried off. Feeding is very largely by grazing pasture. There is some conservation of surplus spring/summer growth by way of hay or silage production and some cropping for winter feed but the desired balance between pasture availability and optimum use is largely achieved by regulating or rationing pasture intake. This system is in marked contrast to that of most of the major Northern Hemisphere dairy industries where cattle must be kept and fed indoors for much of the year. The New Zealand pasture-based system involves a much less intensive use of labour, buildings and energy. These physical advantages are complemented by a generally high degree of technical knowledge and management skills which owe a lot to long-standing scientific and educational efforts, largely Government-sponsored. Two particularly important aspects of this are herd improvement based on genetic merit and the development of grazing management systems.

Milk production in New Zealand for export manufacture has traditionally been measured on the basis of its milkfat content largely because in the past this could be measured more accurately than the total of the milk solids or the remaining 'solids-non-fat' (SNF) fraction of the milk solids. Milkfat also has a historical importance based on the fact that in earlier years the fat fraction was the basis of the bulk of dairy product manufactured and, until quite recently, farmers were paid solely on the basis of the milkfat content of milk supplied to dairy factories.

Table 1 shows developments during the past twenty years in dairy cow numbers, total milkfat production and production per cow. In 1960 milkfat production totalled 245,000 tonnes, while by 1970 production had grown to 278,000 tonnes and by 1980 to a record of an

estimated 317,000 tonnes. Over the period the number of dairy cows in milk has increased, but all of the growth occurred between 1960 and 1970 when the number of dairy cows in milk grew by 23 percent, from 1.89 million to a peak of 2.32 million. Since that time numbers have tended to fall marginally each year, declining to 2.04 million by 31st January, 1979, largely reflecting lower real farm gate prices for milk and the influence of a number of severe droughts.

TABLE 1
Cows in Milk, Production and Herd Size

Season Ended	Total Dairy ¹ Cattle (000)	Cows in ¹ Milk (000)	Total ² Milkfat Production (000 tonnes)	Milkfat ³ Per Cow (kg)	Average ⁴ Herd Size
May					
1960	2,973	1,887	245	130	57
1961	3,112	1,929	249	129	59
1962	3,136	1,968	248	126	62
1963	3,133	1,997	253	127	65
1964	3,128	2,011	265	132	67
1965	3,174	2,032	282	139	70
1966	3,362	2,088	292	140	76
1967	3,506	2,131	296	139	80
1968	3,698	2,233	289	129	86
1969	3,793	2,304	301	131	92
1970	3,729	2,321	278	120	97
1971	3,539	2,239	279	125	100
1972	3,360	2,200	292	133	102
1973	3,355	2,190	280	128	106
1974	3,273	2,140	261	122	109
1975	3,125	2,080	273	131	112
1976	3,008	2,092	296	141	115
1977	2,966	2,074	303	146	116
1978	2,932	2,053	279	136	120
1979	2,917	2,040	301	147	122
1980 ⁵	. .	2,040	317	156	126

Sources: Department of Statistics and N.Z. Dairy Board.

1. As at 31st January, includes factory supply and town milk supply herds.
2. Includes milk fed to stock and waste, excludes separation loss.
3. Total milkfat production as defined in footnote 2 divided by dairy cows in milk.
4. Factory supply dairy herds of more than ten cows.
5. Estimates.

A long-term upward trend in production of milkfat per cow has been evident over the past twenty years, as illustrated by the figures in table 1 although changing weather conditions have resulted in significant variations from year to year. This rising trend reflects changes in the breed composition of the national dairy herd and genetic improvements. In the 1979/80 season milkfat production per cow reached a record of 147 kg, compared with an average of 132 kg for the ten years 1960 to 1969, a period when weather conditions were relatively favourable. The effects of dry weather on production can be clearly seen in table 1, with dry summers having occurred in 1969/70 and 1973/74 and severe droughts in 1972/73 and 1977/78. Much of the increase in production per cow can be attributed to the genetic improvement of the national herd and this has been achieved largely by the use of artificial breeding. In 1978, approximately half of all dairy cows in milk were artificially inseminated, compared with 45 percent in 1968 and only 17 percent in 1958. In addition there has been a change in the breed composition of the herd, which has resulted in an increase in the average size of dairy cows used. The supply to dairy factories was formerly largely based on the Jersey cow, a relatively

small animal well suited to most New Zealand conditions which produces milk with a high milkfat content. Use of this breed became less common with the switch to tanker collection of wholemilk in place of cream and the increased value of the non-fat solids. Consequently there has been a significant switch to the Friesian breed (normally in the form of Friesian/Jersey cross) whose milk has a higher proportion of non-fat solids but because of its larger size will often produce as much or more milkfat per cow than a purebred Jersey. Genetic considerations aside, the national dairy cow totals therefore tend to understate the growth in productive capacity. The extent of the changed breed composition is illustrated to some extent by data on the use of the two main breeds as herd sires: 46 percent Friesian and 45 percent Jersey in 1977/78 as compared with 12 percent Friesian and 81 percent Jersey in 1962/63.

The size of the average dairy herd (number of cows milked) per farm has doubled in the period under review, growing from 57 to an estimated 126 between 1960 and 1980. Parallel with this has been a reduction in the number of commercial dairy herds which now stands at about 16,000, less than half the number of twenty years ago. There has been a tendency for neighbouring farms to amalgamate to achieve economies of scale, especially in the mechanisation of milking. (Virtually all cows in commercial herds are now machine milked.) Large scale dairying has become more popular but is still relatively small. However, the owner-operator or family farms remains the basis of the industry. On average about 1.5 labour units are employed on commercial dairy farms which means there are on average approximately 80 milking cows per labour unit. The low labour usage partly due to the mechanisation of milking and the changeover to tanker collection of wholemilk for factory processing and the consequent reduction in the numbers of skimmilk fed pigs being raised on dairy farms.

As shown in table 2, approximately 90 percent of total milk production is used in the manufacture of dairy products with the remainder being used for liquid milk and cream consumption and for stock food. (Fresh milk for domestic consumption is produced by a separate 'town milk supply' industry accounting for about 9 percent of total output though a significant proportion of this is excess to fresh milk needs at the peak of the season and is diverted to dairy factories. Production is largely based on Friesian cattle and milk flow is relatively even throughout the year in contrast to the sharply seasonal pattern of output from the factory supply industry.) Of the products manufactured about 88 percent are exported on average, somewhat less for butter and cheese and higher for casein and skimmilk powder. Since 1960 the proportion of milkfat utilised in the production of butter has risen slightly to around 73

percent, while the proportion used in the manufacture of cheese has fallen to around 12 percent allowing an increasing amount to be used in the manufacture of other wholemilk products, largely a variety of wholemilk powders.

TABLE 2
Utilisation of Milkfat

	Average Percentage Utilisation in 5 seasons to:		m. kg in 1978/79
	1964/65	1978/79	
Butter (including AMF)	70.6	72.7	218.4
Cheese	15.5	11.9	34.5
Other Wholemilk Products	1.8	5.7	21.3
<i>Total Processed by Factories:</i>	88.0	90.3	274.2
Milk and Cream, fed to stock and wastage	12.0	9.7	27.1
TOTAL:	100.0	100.0	301.3

Source: Derived from New Zealand Dairy Board data.

Table 3 illustrates the changes which have taken place in dairy production over the past twenty years. Butter production has expanded by 23 percent over the period, while cheese production has tended to fluctuate from year to year, depending on market conditions at the time. Dramatic growth in the output of the by-products of butter production, the SNF products skimmilk powder (up to 300 percent) and casein (up to 86 percent) and also of condensed and powdered wholemilk (up 478 percent) has been achieved largely because of the increase in the tanker collection of wholemilk from farms. Tanker collection now accounts for 99 percent of milkfat supplied to dairy factories compared to approximately 60 percent in 1960, the remainder being supplied in the form of cream. At the same time there has been a tremendous increase in the diversity of products being manufactured in New Zealand with nearly thirty different classes of products now being made, each of which can be subdivided further into many types. For example, ten different types of butter are now being produced and there are now forty different specifications of skimmilk powder (SMP).

Changes in market structure, including restrictions on access to markets especially the traditional United Kingdom market for butter and cheese, have led to a significant change in emphasis away from the production of bulk commodities towards a wide variety of more sophisticated food products, including many manufactured to the specifications of individual customers. However, restrictions on access to the Northern Hemis-

TABLE 3
Manufacture of Dairy Products

(000 tonnes)	Season																		
	1961- 1962	1962- 1963	1963- 1964	1964- 1965	1965- 1966	1966- 1967	1967- 1968	1968- 1969	1969- 1970	1970- 1971	1971- 1972	1972- 1973	1973- 1974	1974- 1975	1975- 1975	1976- 1977	1977- 1978	1978- 1979	1979- 1980
Creamery Butter	210.8	217.4	232.4	246.0	255.3	257.6	250.9	271.2	240.0	230.9	247.3	241.7	213.6	243.7	255.6	277.1	233.6	251.8	259.8
Cheese	102.2	100.0	96.6	107.9	107.4	111.5	111.6	97.6	100.2	107.8	104.3	101.1	89.0	88.6	104.8	81.0	78.3	90.2	105.5
Condensed and Powdered Wholemilk	15.1	14.6	15.9	13.5	15.6	15.7	14.6	17.3	23.4	25.5	38.4	35.0	50.3	33.9	46.8	77.9	78.6	77.4	87.4
Skimmilk Powder	42.4	51.6	63.9	81.5	87.3	139.7	147.2	135.5	112.3	125.0	197.0	189.2	194.1	243.7	207.0	205.7	172.8	174.4	169.2
Buttermilk Powder	17.6	18.2	20.2	22.1	25.0	23.6	23.5	24.1	20.88	19.0	22.5	22.4	19.0	24.2	24.3	23.5	19.9	23.7	25.8
Casein	35.9	38.2	42.9	42.4	53.9	47.6	47.1	68.8	63.0	55.6	40.27	46.3	35.5	34.0	52.7	57.0	57.0	63.5	67.0

Sources: NZ Dairy Board and Department of Statistics.

phere markets tends to limit the scope for diversification of the range of products which can be produced and sold at worthwhile prices.

Nearly all dairy product manufacture in New Zealand is carried out in plants owned co-operatively by the farmers who supply them with milk. During the last twenty years there has been a tendency for dairy companies to amalgamate in order to take advantage of economies of scale, with the number of companies dropping from 180 in 1960/61 to only 54 in 1978/79. Plants are generally quite large by international standards and are relatively efficient in terms of processing costs despite the need for excess capacity to provide for the very seasonal nature of the milk flow and, in many cases, to provide also for substantial changes in the export product mix. In recent years there has been a great deal of restructuring within the industry in order to diversify production, upgrade plant, and increase flexibility. One major achievement of this programme has been a significant diversification of the types of cheese production in place of the former emphasis on cheddar cheese produced for the United Kingdom market, access to which was phased out in the 1970's but subsequently has reopened for a small quantity. Substantial further investments costing in the region of \$600 million at 1980 prices are planned for the decade ahead, with emphasis on the products which show best prospects for long term growth, especially cheese and casein, at the expense of butter and SMP. In addition, facilities will be developed for the manufacture of whey solids.

The unique structure of the New Zealand dairy manufacturing and marketing sector with farmer-owned co-operative plants selling to the New Zealand Dairy Board, sole exporter for most products, means that substantial changes to the national product mix can be quickly achieved according to changes in market conditions.¹ These are usually brought about by altering the structure of product prices paid by the Board to companies.

THE INTERNATIONAL DAIRY PRODUCTS MARKET

The freely accessible international market for the main dairy products, (butter, cheese and SMP) and for many minor products is relatively small because of various barriers to imports in the main consuming nations, the developed countries of the Northern Hemisphere. Import barriers are designed to protect the market for domestic milk products in these countries who often impose support prices at a level which reduces consumption with the result that production exceeds demand in a number of cases. The relatively small international market takes up much of the variation in supply and demand from the total world market and consequently is characterised by substantial price fluctuations. A number of countries significantly vary their supply to or demand from the international market according to changes in their own markets, especially supply. Prices are normally well below those ruling in the large protected Northern Hemisphere markets of the EEC and North America, partly because excess production is often dumped on the international market at prices well below cost of production.

The New Zealand position in this market is unique.

1. To help illustrate changes in product mix shown in table 3, approximate yield factors may be of some interest; cheese production from the same volume of milk will be about 2 times that for butter and the ratio of skim milk powder to casein from the same volume of skim milk is about 3 to 1.

Milk supply is very small by international standards, the proportion manufactured rather than consumed fresh is high. New Zealand is the world's largest exporter and it is also the only exporter who relies on the international dairy products market for a high proportion of its total export income though exports to this market are also significant for Australia and two of the smaller EEC countries, Denmark and Ireland. New Zealand's main competition on the international market comes from the countries of the EEC, Australia, and also Canada in the case of SMP. Importers are more numerous and diversified. Most countries, including an increasing number of less developed countries, import at least some dairy products. The largest importers in recent years have been the EEC, U.S.A., Japan and the U.S.S.R. There are also substantial shipments of dairy products as food aid to a number of less developed countries.

The enlarged EEC is the largest producer and consumer of dairy products in the world, accounting for approximately 23 percent of total world production. The EEC also has the greatest problem in achieving a balance between supply and demand and in 1979 excess production was estimated to be of the order of 17 percent. Much of the reason for the problems faced by the EEC dairy industry can be traced to the structure of the industry itself. Farms in the community are generally relatively small (as are the processing plants) though there is a wide range from subsistence farms to those which are relatively large and efficient. The average herd size in the EEC in 1975 was only 11 cows compared with 112 in New Zealand and only 3 percent of herds contained more than 50 cows compared with 96 percent in New Zealand. Large numbers of people with considerable electoral influence are employed in the industry which tends to ensure that production and incomes are maintained by government policies. Under the Common Agricultural Policy (CAP) a target price, currently well above the world price, is set each year for milk products and levies are made on imports so that they sell at or above the target price. This price is maintained by the buying in and storing of the product whenever the price falls to a certain minimum level known as the intervention price. As well, export 'restitutions' are used to subsidise sales of surplus stockpiles on world markets and various other measures, such as the use of subsidies to encourage the use of SMP for animal food, have been introduced. However, dairy support is becoming increasingly burdensome to member countries, costing a record ECU 4.5 billion (NZ\$6.4 billion) in 1979 and resulting in nearly 50 percent of EEC butter and 90 percent of EEC SMP being disposed of below cost during the year. Some steps have been taken to discourage excess production although so far success has been limited. The most important of the measures taken to reduce milk production are the system of premiums for the non-marketing of milk and the conversion of dairy herds to beef production, the 'co-responsibility' levy on milk production above a specified level and the payment of a subsidy to encourage the use of liquid skim milk for animal feeding. Despite these steps milk production continues to increase largely because the gains amongst smaller, less efficient farms have been offset by higher milk yields amongst the larger, more efficient, farms for whom it remains profitable to use increasing quantities of concentrate feeds to boost production.

In the longer run there seems some prospect of a balance being achieved between supply and demand in the EEC. The high and rising cost of supporting agriculture is becoming an increasingly contentious topic in

the community, which tends to suggest that more effective action will be taken at some stage.

The Australian dairy industry underwent a considerable amount of restructuring during the 1970s amongst the less efficient producers with a sharp decline in the numbers of dairy cows, a fall in total milk production and a marked shift in the product mix. The production of casein and butter has fallen while production of cheese and WMP has increased. Production of SMP rose during the early 1970s but has fallen since 1976. These changes stemmed largely from the accession of the U.K. to the E.E.C. in 1973 which closed the U.K. market to imports of butter and cheese from Australia and made the remaining export market for Australian dairy products both smaller and more unstable, but was also hastened by the reduction of the Australian Government butter and cheese subsidy scheme. This restructuring has been of considerable assistance to the New Zealand industry as competition has been reduced, particularly in South East Asia.

Canada has also taken steps to reduce production and bring it more into line with domestic requirements by applying heavy penalties to producers who exceed a set quota. Canada remains an important exporter of SMP though on a much reduced scale.

Consumption of cheese has been expanding worldwide, boosted by consumer preferences moving in its favour and assisted by the increase in the relative price of other forms of protein, particularly meat. In the U.S.A. consumption per head of cheese rose from 6.9 kg to 9.5 kg between 1968 and 1977 while in the U.K. over the same period consumption increased from 5.0 kg to 6.2 kg. However, New Zealand is faced with restrictions when selling its cheese on world markets, as it faces quotas or blanket restrictions in most major markets apart from Japan. Until the early 1960s New Zealand manufactured only cheddar type cheeses but increasing demand for other types of cheese, particularly in Japan and the U.S., has encouraged the production of other types such as edam, gouda and pepato. Brine salted cheeses now account for 8 percent of New Zealand cheese exports.

The international market for casein, another high protein dairy product, has also grown considerably in recent years. Casein is now increasingly used in the manufacture of food products such as coffee whiteners, 'imitation' cheese, frozen deserts and much less as an industrial raw material for purposes such as the manufacture of linoleum, glue and paper coating. Casein is one of the few dairy products not subject to any restrictive trade practices, although during the past year U.S. milk producers have lobbied to ban imports of casein for use in foodstuffs into the U.S. as they feel that casein is displacing locally produced non-fat dry milk in food manufacture. However, these moves appear to have been unsuccessful and the U.S. remains New Zealand's major market for casein.

As shown in table 4, world milk production has continued to grow, with the EEC contributing substantially to the increase. Demand in general however has failed to keep pace with this increase, particularly for the storable products (butter and skim milk powder) into which excess production tends to be converted.

Butter consumption in most developed countries has been declining over the past twenty years reflecting high support price levels for butter, increased consumer preference for margarine and other changes in dietary patterns and preferences. For example, consumption per head in the U.K. declined from 8.8 kg in 1968 to 7.6 kg in 1977 and in Canada from 7.5 kg to 4.7 kg. Until the U.K. joined the EEC it took a large percentage of New Zealand's butter exports. Since that time however imports of New Zealand butter into the U.K. have been subject to a gradually reducing quota and intensive efforts have had to be made to find new markets. Unfortunately the international butter market (excluding intra-EEC trade) is very small, amounting to only about 230,000 tonnes so the prospects for further diversification are not good, particularly since the EEC disposes of much of its excess production on the international market at subsidised prices.

Demand for SMP has grown steadily with the establishment of increasing numbers of milk recombining plants in Asia, producing liquid milk from milk

TABLE 4
Milk Production in Major Producer Countries
(000 tonnes)

	Average		1971	1972	1973	1974	1975	1976	1977	1978	1979 ¹
	1961-65	1966-70									
Belgium/Luxembourg	4,032	4,044	3,819	3,879	3,850	3,959	3,869	3,843	3,872	4,022	4,100
Denmark	5,313	4,995	4,406	4,636	4,729	4,818	4,918	5,045	5,138	5,324	5,324
France	25,091	28,515	37,639	28,846	29,291	29,470	29,686	29,536	30,210	30,800	31,800
West Germany	20,586	21,853	21,165	21,490	21,265	21,508	21,604	22,165	22,523	23,296	23,700
Ireland	2,939	3,536	3,742	3,936	4,153	4,041	4,258	4,537	4,835	4,717	5,087
Italy	9,286	9,776	9,312	9,859	9,690	9,470	9,385	9,572	9,385	9,700	9,900
Netherlands	7,068	7,741	8,392	8,951	9,354	9,915	10,221	10,082	10,612	11,367	11,502
United Kingdom	12,012	12,495	13,305	14,171	14,402	13,993	13,934	14,419	15,212	15,925	16,012
<i>Total E.E.C.</i>	86,326	92,955	91,780	95,768	96,734	97,174	97,875	99,199	101,787	105,151	107,425
Canada	8,356	8,352	7,932	8,026	7,667	7,633	7,751	7,693	7,751	7,622	7,680
U.S.A.	56,999	53,451	53,780	54,472	52,386	52,429	52,314	54,553	55,655	55,305	55,719
U.S.S.R.	63,826	79,838	82,600	82,700	87,800	91,300	90,300	88,658	94,429	94,177	92,800
Japan	2,713	4,057	4,827	4,939	4,908	4,868	4,963	5,265	5,713	6,145	6,450
Australia	6,813	7,274	7,474	7,298	7,167	6,965	6,677	6,421	5,933	5,620	5,819
New Zealand	5,568	6,185	5,937	6,216	5,988	5,680	6,014	6,538	6,536	5,876	6,361
World	325,562	360,130	364,861	374,016	380,260	387,129	390,189	396,675	410,081	416,769	420,251

¹ Estimate.

Source: United Nations Statistical Yearbook.
FAO Monthly Bulletin of Statistics.

powders and anhydrous milk fat. However, high support prices in some producing countries, particularly the E.E.C., have caused the periodic build up of stock-piles and consequent sharp fluctuations in price from time to time. For example, in the mid-1970s prices for SMP on the international market rose briefly to over US\$1,000 per ton compared with an average of between US\$550 and \$600 in mid-1979, when stocks were relatively high.

UNITED KINGDOM ACCESS

Up until 1973 when it joined the EEC, the UK provided a major market outlet for the bulk of New Zealand dairy products. From 1973 to 1977 imports of butter and cheese became subject to quotas negotiated with the Community and specified in protocol 18 of the Treaty of Accession. These quotas covered the period up until 1977 and were as follows:

	<i>Butter (tonnes)</i>	<i>Cheese (tonnes)</i>
1973	165,811	68,580
1974	158,902	60,960
1975	151,994	45,720
1976	145,085	30,480
1977	138,176	15,240

These quantities were to be imported at a guaranteed cif price equal to the average price obtained by New Zealand on the UK market during the four years to 1972 and were subject to special levies in order to bring their selling price up to the EEC target price. However some price increases were allowed during the term of the agreement to compensate for the erosion of returns to the New Zealand farmer brought about by inflation and rising freight and production costs.

In 1975 and 1976 further negotiations took place in order to decide on access for New Zealand dairy products beyond 1977. Quotas as shown below were set for butter imports into the UK for a further 3 years but no further access could be negotiated for cheese.

	<i>Butter (tonnes)</i>
1978	125,000
1979	120,000
1980	115,000

Agreement was also obtained for periodic adjustments to be made to prices, taking into account prices paid to EEC farmers, production costs in New Zealand and changes in freight costs.

In September 1980 the EEC agreed to raise the return on New Zealand sales from 50 percent of their intervention price to 75 percent by reducing the import levy. In return, New Zealand agreed to a reduction in its import quota of 20,000 tonnes from 115,000 tonnes to 95,000 tonnes.

Access beyond 1980 is still to be decided, although the EEC Commission has proposed that the New Zealand butter quota will be progressively reduced to level of 90,000 tonnes by 1984. A new system of price setting is also being considered under which a fixed but lower levy will be introduced to ensure that NZ butter will be able to be sold more steadily than in the past.

The current negotiations are of vital importance to New Zealand as the UK still accounts for around 30 percent of total dairy export receipts and 75 percent of butter receipts. Although New Zealand has made a

concerted effort to find new markets there is no other market capable of absorbing the amount of butter currently being sold by New Zealand in the UK. As shown in the table below butter exports to the UK have declined from 96 percent of the total in 1969 to 76 percent in 1979 and in addition some product formerly sold as butter in conventional form is now being sold in other markets as A.M.F. and Ghee.

EXPORTS OF BUTTER BY DESTINATION (000 tonnes)

<i>Years Ended June</i>	<i>1969</i>	<i>1974</i>	<i>1979^P</i>
Iraq	—	—	3.5
Jamaica	1.4	3.0	0.5
Japan	—	12.9	0.3
Trinidad and Tobago	1.0	0.8	—
United Kingdom	186.9	98.3	125.0
USSR	—	—	12.9
USA	0.2	9.7	0.3
Others	5.0	13.3	22.2
<i>Total exports as butter:</i>	<i>195.5</i>	<i>138.0</i>	<i>164.7</i>
AMF and Ghee ¹	13.9	26.6	32.3
<i>Total Butter, AMF and Ghee¹</i>	<i>209.4</i>	<i>164.6</i>	<i>197.0</i>

Source: New Zealand Department of Statistics.

P = provisional.

1. Estimated butter equivalent basis.

GATT NEGOTIATIONS

From time to time major multilateral trade negotiations have taken place under GATT, the most recent being the 'Kennedy Round' which took place between 1964 and 1967 and the 'Tokyo Round' which took place between 1973 and 1979. Although New Zealand has attempted to gain improved access for its dairy products in these and other negotiations, success has been minimal. In 1963 an international agreement on whole-milk powder was established in the OECD providing for a minimum selling price and setting up consultative procedures. Similar agreements were established under GATT for SMP in 1970 and for AMF in 1973. At the end of 1978 the minimum price levels per tonne were:

	<i>\$US</i>
WMP	600
SMP	350
AMF	680

During the 'Tokyo Round' of multilateral trade negotiations an International Dairy Arrangement was agreed upon to take effect from January 1980, with higher minimum export prices set as follows:

<i>Product</i>	<i>\$US</i>
SMP	425
WMP	725
Buttermilk Powder	425
AMF	1100
Butter	925
Certain Cheeses	800

Exports of dairy products for animal feed purposes, food aid and development purposes were excluded from the application of these minimum pricing arrangements. Although these prices will have the effect of limiting the level of export subsidies which can be applied by

exporters, and thus provide a floor to the market, they are well below the production costs of even the most efficient producers.

New Zealand's bilateral negotiations with the EEC and the U.S. under GATT were of limited benefit to N.Z. However New Zealand was able to increase its U.S. cheese quota from 7,500 tonnes to 17,422 tonnes and to gain access for 9,500 tonnes of cheese to the EEC.

EXPORT RECEIPTS

Export receipts for dairy products have always made up a substantial proportion of total New Zealand export receipts, although this proportion has been declining steadily over the past twenty years. In 1960, 28 percent of total export receipts were earned from dairy products while by 1980 this had fallen to around 16 percent.

It should be noted that because figures for exchange transactions included in tables 5 and 6 refer to foreign currency proceeds received through the banking system in the period stated and not directly to shipments made in the period. Changes in the time lags between shipment and payment can affect the pattern of receipts and should be taken into account when comparing shipments with receipts.

The traditional mainstays of New Zealand's export dairy trade were butter and cheese and in 1960 they together accounted for 87 percent of total dairy receipts. However by 1980 this percentage had declined to 48 percent, reflecting the extent of diversification of both markets and production away from trade with the U.K.

Receipts for casein and 'other' milk products have correspondingly risen as a proportion of total dairy receipts with casein now making up 15 percent of the total compared with 5 percent in 1960 and other (including milk powders) rising from 9 percent in 1960 to 38 percent.

There has also been a considerable diversification in the markets in which New Zealand sells its dairy exports. The United Kingdom, while still the largest single market for New Zealand dairy produce, has declined in importance and now takes roughly 30 percent of dairy exports compared with more than 80 percent in 1960. Japan and the United States are the next largest markets, accounting for 12.3 percent and 13.5 percent of total receipts respectively in 1980 compared with 2.5 percent and 3.4 percent in 1962. Casein sales have contributed substantially to growth in both markets, but increased sales of cheese and milk powders have also had an effect. Recently Malaysia, Indonesia and the Philippines have also become increasingly important as outlets for New Zealand's dairy products, particularly milk powders.

PRODUCER RETURNS

The marketing of dairy products overseas is carried out by the New Zealand Dairy Board which purchases virtually all dairy produce intended for export and sells it overseas. Prior to 1965 the price at which butter and cheese were purchased by the Board was set by the Dairy Prices Authority each season in accord with market returns but also taking into account the stability of the industry, the state of industry funds and market prospects. Between 1965 and 1972 the Authority set the butter price only, while the Dairy Board set the cheese price so that returns reflected the returns for butter/casein and butter/SMP. Since the 1975/76 season separate prices have been set by the Dairy Prices Authority for milkfat and solids-non-fat on a farm gate basis. The prices set by the Authority normally may not increase by more than 10 percent or decrease by more than 5 percent between one season and the next. Export purchase prices for the major dairy products are set by the Dairy Board on the basis of these farm gate prices plus manufacturing and milk collection costs. However, differentials may be applied between various products

TABLE 5
Overseas Exchange Transactions
Export Receipts — Dairy Products
(\$ million)

	Years ended June						
	1974	1975	1976	1977	1978	1979	1980
United Kingdom	113.3	100.0	164.4	225.4	226.2	190.3	232.1
Japan	40.5	36.9	57.7	70.6	67.6	74.1	99.3
U.S.A.	46.0	24.6	45.2	53.9	80.6	87.1	109.4
Malaysia	8.2	15.4	26.5	24.1	30.8	29.0	26.2
Philippines	14.0	22.7	18.0	19.6	22.9	29.1	38.1
Peru	17.4	18.4	29.4	17.2	16.0	11.5	17.5
Indonesia	3.1	6.2	6.2	14.8	21.0	15.7	35.7
Jamaica	3.9	5.7	7.9	13.1	8.5	3.5	3.3
Spain	—	0.1	0.1	10.2	0.4	1.7	3.3
Singapore	6.0	9.3	9.3	10.1	11.8	14.1	14.0
Venezuela	—	0.8	2.7	9.5	14.5	9.5	13.8
Taiwan	2.7	3.7	6.1	8.5	13.5	13.9	10.9
West Germany	2.2	1.9	5.6	8.3	8.1	6.8	7.6
Mexico	3.1	8.7	2.8	8.1	4.0	2.0	12.7
Thailand	5.2	5.2	7.2	8.0	7.5	11.1	12.8
U.S.S.R.	—	—	—	7.1	—	5.3	41.9
Trinidad and Tobago	2.0	1.5	7.8	6.5	6.5	4.1	3.8
Australia	2.7	3.4	4.5	6.4	7.9	10.0	13.1
Other	43.8	51.8	72.1	61.5	71.9	80.8	115.1
TOTAL	314.1	316.3	473.5	582.9	619.7	599.6	810.6

Source: Reserve Bank of New Zealand

TABLE 6
Overseas Exchange Transactions
Export Receipts: Dairy Products
 Years ended June
 (\$ million)

	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
United Kingdom	138.2	154.2	154.5	142.4	151.0	145.6	148.6	161.2	165.8	190.9	132.5	113.3	100.0	164.4	225.4	226.2	190.3	232.1
Australia	0.6	0.6	0.7	0.8	1.0	0.9	1.2	1.7	2.1	2.1	2.7	2.7	3.4	4.5	6.4	7.9	10.0	13.1
Canada	—	—	—	—	0.9	0.7	1.0	0.4	0.6	0.7	5.5	6.0	8.2	0.9	1.2	1.5	1.1	2.9
Japan	3.4	4.2	4.5	7.7	18.9	19.4	14.2	15.2	17.2	19.3	33.6	40.5	36.9	57.7	70.6	67.6	74.1	99.3
U.S.A.	4.7	8.6	9.4	11.4	19.5	21.4	15.7	22.1	20.2	20.8	20.8	46.0	24.6	45.2	53.9	80.6	87.1	109.4
Other	17.2	18.7	25.8	40.5	36.0	30.5	30.7	40.3	55.0	93.0	69.9	105.6	143.2	200.8	225.4	235.9	237.0	353.8
TOTAL	164.1	186.3	194.9	202.8	227.3	218.5	211.4	240.9	260.9	326.8	310.1	314.1	316.3	473.5	582.9	619.7	599.6	810.6
Of which:																		
Butter	103.5	113.1	111.0	106.9	118.7	106.5	109.4	118.5	124.5	145.3	106.3	108.5	113.2	185.9	211.8	233.0	208.1	299.0
Casein	9.2	11.0	19.0	18.9	16.4	22.0	23.2	28.1	34.7	27.8	22.0	33.3	26.3	26.6	64.8	82.1	92.4	119.0
Cheese	38.5	45.2	44.2	48.5	54.2	45.8	41.3	50.9	51.8	71.7	64.3	58.4	34.5	87.5	95.2	83.7	81.7	87.6
Milk Powders	..	..	..	..	..	..	..	..	..	..	..	91.4	116.4	116.7	149.7	157.8	154.9	222.8
Other Milk Products	12.9	17.1	20.8	28.4	38.1	44.2	37.5	43.4	49.9	82.0	117.5	22.5	25.9	56.8	61.5	63.2	62.4	82.2

Source: Reserve Bank of New Zealand.

at times in order to achieve the optimal product mix.

Two separate accounts are kept by the Dairy Board to record its export trading, one for milkfat products and one for SNF products. Up to 50 percent of any surplus in either of these accounts may be distributed at the end of the season provided government approval is obtained. Any remaining surplus or deficit is transferred to the Dairy Industry Reserve Account which in the long run must be self-balancing.

Dairy farmers' real incomes have fluctuated considerably in the period under review both with the effect of climate on milk production and variations in overseas prices. Dairy farmers' terms of exchange (i.e. the ratio of prices received for milk and other products to prices paid for inputs) improved during the early 1970s but have tended to gradually decline since that time as the increase in payments to farmers has not kept pace with inflation.

TABLE 7
DAIRY FARMERS' TERMS OF EXCHANGE
 Base: 1970-71 1000

	Prices Received	Prices Paid	Terms of Exchange
1967/68	823	870	946
1968/69	834	890	937
1969/70	905	937	966
1970/71	1,000	1,000	1,000
1971/72	1,243	1,047	1,187
1972/73	1,323	1,133	1,168
1973/74	1,437	1,312	1,095
1974/75	1,355	1,494	907
1975/76	1,586	1,701	932
1976/77	1,706	1,932	883
1977/78	1,896	2,187	867
1978/79	2,256	2,437	926
1979/80 ^P	2,520	2,827	891

Source: New Zealand Dairy Board
 P = Provisional.

CONCLUSION

The New Zealand dairy industry is a major source of foreign exchange for New Zealand, accounting for \$811 million or 16 percent of total export receipts in 1979/80 directly from the sale of dairy products and a further significant amount from the export of beef and animal by-products. New Zealand is one of the largest exporters of dairy products in the world but has faced considerably difficulty trading in international markets in recent years due to continued excess world production of milk, the wide array of protective devices employed by both exporting and importing countries, the decline in demand for some dairy products and, most importantly, the reduction in access to the U.K., after its accession to the E.E.C. in 1973. In order to cope with these problems a great deal of restructuring has had to be undertaken at all levels of the industry and new markets have had to be developed. In the 1980s this process will continue. The general trend towards increased diversification of markets is also likely to continue with Japan, North America, the Middle East, Latin America and Asia being the most likely areas for growth. The South East Asian market for dairy products is expected to continue gradually expanding and the oil exporting countries of the Middle East have considerable potential for expansion of sales.

The problem of excessive world milk production is unlikely to be solved in the short run. Although Canada and Australia both seem likely to cut back production further, the E.E.C. is still expected to continue producing a surplus. By the mid-1980s, however, there appears to be some prospect that a better balance can be achieved between supply and demand in the community if the existing restructuring measures can be maintained or reinforced. If this does occur and New Zealand is also able to satisfactorily conclude the continuing negotiations for access to the U.K. market, the dairy industry is likely to maintain its present importance as a source of export revenue.