

AGRICULTURAL  
ECONOMICS  
RESEARCH UNIT



Lincoln College

STUDIES IN COSTS  
OF PRODUCTION  
TOWN MILK SUPPLY FARMS  
1973-74

by

R. J. GILLESPIE

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### *THE AGRICULTURAL ECONOMICS RESEARCH UNIT*

THE UNIT was established in 1962 at Lincoln College, University of Canterbury. Its major sources of funding have been annual grants from the Department of Scientific and Industrial Research and the College. These grants have been supplemented by others from commercial and other organisations for specific research projects within New Zealand and overseas.

The Unit has on hand a programme of research in the fields of agricultural economics and management, including production, marketing and policy, resource economics, and the economics of location and transportation. The results of these research studies are published as Research Reports as projects are completed. In addition, technical papers, discussion papers and reprints of papers published or delivered elsewhere are available on request. For list of previous publications see inside back cover.

The Unit and the Department of Agricultural Economics and Marketing and the Department of Farm Management and Rural Valuation maintain a close working relationship in research and associated matters. The combined academic staff of the Departments is around 25.

The Unit also sponsors periodic conferences and seminars on appropriate topics, sometimes in conjunction with other organisations.

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## PREFACE

This Report represents a further extension of the activities of the Unit in cost of production studies.

It is the result of a contract between the N. Z. Milk Board and the N. Z. Town Milk Producers' Federation and the Unit for the latter to undertake the annual cost and income survey, initially for three years. In the past, the major objective of these surveys has been to ascertain the average labour return being received by town milk producers in New Zealand.

While this will still be the primary objective in the future it is also hoped to collect and analyse some additional information. This will enable a more comprehensive account of the industry to be presented as well as exploring the implications for management of inter farm differences which emerge.

In future years the report for any particular financial year will be available in the latter half of the following year.

John Gillespie has carried out all the field work and most of the analysis. He has been assisted in analysis by Russell Moffitt and George Gregg.

Professor Owen McCarthy

15th April 1976

Director.



1.

SECTION I

THE SETTING

## 2.

### 1. INTRODUCTION.

#### 1.1. Background to National Farm Survey

The N. Z. Milk Board and the Town Milk Producers Federation first undertook national surveys of town supply farms in 1956/57 and continued annually up to 1961/62. The Federation carried out the survey for 2 years from 1964/65 and then after a lapse of one year, the survey continued on a joint basis with the Milk Board up to 1972/73.

In November 1974, an enquiry was received by the Agricultural Economics Research Unit, Lincoln College from the General Manager of the N. Z. Milk Board concerning the possibility of the Unit undertaking the survey for the 1973/74 year. This was agreed to and following further discussions, the Milk Board and Producers Federation contracted with the Unit to carry out the annual survey for a further two years.

#### 1.2. Objectives of National Survey

As in previous years, the principal object of the 1973/74 survey was to ascertain the average net farm income<sup>1</sup> being received by town milk producers in New Zealand. Information produced by the survey is also used to assist decisions concerning applications for price increases from specific producer groups. The national average cost and return levels, are used as benchmarks with which cost and return figures derived from smaller regional surveys can be compared. The survey data obtained also provide a continuing set of statistics on the economic position of town supply dairy farmers. The availability of such information is of value to the individual farmer, regional advisors, and Government policy makers.

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<sup>1</sup>Previous reports used the term labour reward which in fact is defined the same way (gross farm revenue minus total farm expenditure) but the term net farm income is preferred here. Total farm expenditure includes all labour except owner operator.

In addition, results of this and earlier Surveys have yielded information about the efficiency of resource use, systems of management and net profitability.

### 1.3. The 1973/74 Season

The survey period covered by this Report extends from 1st April 1973 to 31st March 1974.

#### 1.3.1. Climatic Conditions

Adverse weather conditions affected milk production in several of the survey regions during the 1973/74 season. The worst affected areas in the North Island were South Auckland, Manawatu, Taranaki and Hawkes Bay. The 1972/73 summer drought was followed by a long cold wet winter in most areas. This resulted in spring growth being somewhat retarded. Many areas also experienced drought in the summer of 1973/74. These poor climatic conditions forced many producers to purchase dairy meal and extra hay to maintain their quota supply. There were also considerable forage crop losses in some areas, due to poor germination and insect attack.

South Island town milk suppliers also experienced relatively poor weather conditions during the year. Canterbury and Nelson suppliers utilized irrigation for longer periods than normal during the summer. Dunedin producers had to contend with a longer than usual feeding out period to maintain production. Summer drought was also a problem particularly on the Tairei Plains.

#### 1.3.2. Town Milk Prices for the 1973/74 year:-

As the survey extended over two milk years, the average final national producer prices<sup>2</sup> for finest grade milk relative to the survey period were:-

1st September 1972 to 31st August 1973 - 8.3579 cents per litre

1st September 1973 to 31st August 1974 - 8.9812 cents per litre

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<sup>2</sup> N.Z. Milk Board 21st Annual Report, 31st August 1974.

Due to the variation in producer milk prices between regions, average national prices can often be misleading. South Island producers received a 6 month autumn-winter production allowance of 0.735 cents per litre, to cover extra feed and feeding out costs, while certain areas with particular production problems in both Islands receive special production allowances. These additional allowances which range from 0.550 to 1.100 cents per litre, are subject to periodic review.

### 1.3.3. Changeover to Metric System in 1973/74:-

The N. Z. Town Milk industry officially changed over to the metric system on 1st March 1974. All prices, margins, allowances and so on are now expressed in cents per litre and all bottled milk is now supplied in bottles of 600 ml. 300 ml. and 150 ml. capacity. All statistics and other relevant information contained in this report are expressed in metric terms.

## 2. BACKGROUND TO THE N. Z. TOWN MILK SUPPLY FARMING INDUSTRY

### 2.1. Structure

During the past decade, the N. Z. town supply farming industry has adjusted rapidly to changing economic circumstances: farms have expanded in area, productivity per farm and per cow has increased markedly, and small herds have been withdrawn from dairying or have grown larger. With the main urban areas increasing in population and size, town supply farms have come to be principally situated close to the urban or town boundaries. In some urban areas suppliers are being pressured into moving further out from the urban boundaries. Much of the town supply farming land is easily developed for housing.

While total numbers of town milk producers has been declining, total milk production continues to increase.

Table 1 shows that there has been a decline of about 100 (six per cent) suppliers between 1972/73 and 1974/75 while average daily quotas have increased by 86 litres per supplier.

TABLE 1 Town Milk Suppliers and Daily Quotas

Size of Quota		Total Number of Suppliers			Per cent Suppliers in each Group		
Gallons	Litres (1974/75)	1972/73	1973/74	1974/75	1972/73	1973/74	1974/75
Up to 45	Up to 200	77	67	42	4.29	3.84	2.47
46 to 55	201 - 250	66	47	50	3.68	2.70	2.95
56 to 65	251 - 300	64	74	73	3.57	4.24	4.32
66 to 75	301 - 350	92	84	59	5.13	4.82	3.48
76 to 85	351 - 400	110	68	83	6.13	3.90	4.91
86 to 95	401 - 450	122	108	101	6.80	6.20	5.96
96 to 105	451 - 500	124	125	141	6.91	7.17	8.33
106 to 115	501 - 550	132	119	108	7.36	6.83	6.37
116 to 125	551 - 600	121	92	115	6.74	5.27	6.80
126 to 135	601 - 650	112	116	110	6.24	6.65	6.50
136 to 145	651 - 700	108	103	103	6.02	5.90	6.08
146 to 155	701 - 750	100	87	96	5.58	5.00	6.66
156 to 165	751 - 800	90	108	84	5.02	6.20	4.96
166 to 175	801 - 850	64	77	68	3.57	4.42	4.02
176 to 185	851 - 900	60	67	75	3.34	3.85	4.43
186 to 195	901 - 950	56	45	41	1.56	2.58	2.43
196 to 205	951 - 1000	28	48	58	3.12	2.75	3.43
206 to 215	1001 - 1050	43	35	34	2.40	2.01	2.01
216 to 225	1051 - 1100	35	37	36	1.95	2.13	2.13
226 to 235	1101 - 1150	29	33	26	1.62	1.90	1.53
236 and over	1151 and over	161	203	190	8.97	11.64	11.23
	TOTALS	1,794	1,743	1,693	100.00	100.00	100.00

Source: Town Milk Bulletin, August 1975

Note:	Average Quotas	1972/73	<u>Gallons</u>	<u>Litres</u>
			144	654
			155	703
			163	741

## 2.2. Milk Production

Over the last decade or so increases in per cow performances have been associated with a steady increase in all Friesian herds throughout New Zealand. South Island herds are now about 95 per cent Friesian and the North Island herds about 80 per cent. No doubt, increased use of herd testing and improved breeding methods have also helped increase individual cow performance.

Reference to Table 1, shows that there has been a significant decline in the percentage of farms with less than 250 litre quotas.

TABLE 2

### Production of Town & Surplus Milk for the Period 1st September to 31st August

Year	Total Volume of Milk Produced (M.Litres)	Volume of Milk Sold at Town Milk Prices (M.Litres)	Estimated Volume of Milk Sold at Factory Prices (M.Litres)	Volume of Town Milk Sales (M.Litres)
1969/70	540.8	441.5	99.3	365.0
1970/71	561.3	458.2	103.1	394.1
1971/72	580.3	471.9	108.4	382.3
1972/73	599.2	484.4	114.8	394.2
1973/74	614.2	503.9	110.3	410.2

Source: N.Z. Milk Board.

Table 2 shows that total milk production from town milk suppliers has increased every year from 1969/70 to 1973/74. Previous records also show a continuing increase in total milk supply over the years. National Survey results show that between 21 and 24 per cent of all milk produced is sold at surplus prices.

There is considerable loss of milk caused by disease and poor milking techniques on some farms. While there are no reliable estimates of total milk wastage it is assumed to be at least 3% of total production. Mating and



calving problems are also significant causes of loss of potential milk production. Information on mating and breeding problems has been collated by the N.Z. Dairy Board for factory supply farms<sup>3</sup>.

### 2.3. Town Milk Pricing Policy

The N.Z. Milk and Dairy Boards financial year extends from the 1st September to 31st August. Nominated quantities of milk are agreed to each year between the N.Z. Milk Board and the Town Milk Producer Associations<sup>4</sup>. Each Producer Association fixes quota levels for each producer so that the daily requirement of the local milk market will be met.

Milk required for the sweet cream trade is not included in the nominated quantity. The Board enters into an annual contract with each Producer Association whereby the Association agrees to obtain from each of its members guarantees which equal in total the nominated quantity. The agreement requires the Producer Association to pay reduced prices to individual producers where the milk contains any antibiotic, insecticide, excessive sediment or added water or where it is particularly low in solids - not - fat.

Table 3 shows that the movement in the national average town milk producer price for first grade milk only, over the past few years.

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<sup>3</sup>N. Z. Dairy Board, Farm Production Reports.

<sup>4</sup>The nominated quantity is the amount the Producer Association must undertake to make available from its members on every day of the ensuing year in order to meet the requirements of the local town milk market. There are 47 Producer Associations throughout New Zealand.

TABLE 3

Average National Town Milk Prices

	Advance Price Cents Per Litre.	Final Price Cents Per Litre.
1969/70	5.0386	5.5375
1970/71	5.5652	6.3120
1971/72	6.9079	8.5643
1972/73	7.2493	8.3579
1973/74	6.8081	8.9812
1974/75	9.3184	8.8127

Source: N. Z. Milk Board.

The N. Z. Milk Board pays the Producer Associations the guaranteed milk price on the nominated quantity as on an additional volume over this quantity. The additional percentage is 17 per cent for the months September to January inclusive and 10 per cent for the months February to August inclusive. The town milk price paid is varied according to the season of the year and the quality of the milk. In addition to the town milk price, Government has approved a special payment on all South Island milk and special production allowance to Producer Associations in areas where there are production difficulties. The N. Z. Milk Board maintains a Disaster Fund from any excess funds not used during the financial year. This Fund is used to help producers who suffer from unusual or disastrous losses.

Each Producer Association is allowed to pay out its own seasonal percentages with the permission of the Board. Some Associations pay full price on quota plus a 30 per cent seasonal allowance to attract sufficient milk in mid-winter. The acceptance of surplus milk by Associations varies with the season and throughout the country.

Prior to the 1973/74 financial year, the calculation of the town milk price was based on the N. Z. Dairy Board payout for cheese. Any movements in the overseas receipts for cheese were reflected in the price for town milk.

The relationship between the town milk price and the factory milk price was initially determined by a Milk Commission Study report in 1943, The Commission considered that the standard 48 cow dairy farm producing 5,455 Kg milk fat on factory supply was equivalent to 40 cows producing 90,922 litres of milk for town supply.

In addition to providing for this difference in carrying capacity per farm and production per cow, the town milk price also provided for the additional capital and higher production costs associated with all year round milking. The above relationship gave rise to the formula that a change of one cent per kilogram for milk fat should result in a change of 0.06 cents per litre for town milk.

The town milk price is now based on the price movement of all whole milk pay outs in the dairy industry.

By way of example, the method used to calculate the advance national average price for first grade milk at the commencement of the 1975/76 season is as follows:

1974/75 final national average price (cents/litre)		8.8127
1974/75 final average manufacturing price (cents/Kg.MF.)	133.89	
1975/76 advance average manufacturing price	<u>125.71</u>	
Reduction in price (cents/Kg.MF.)	<u>8.18</u>	
Reduction in price multiplied by 0.06 cents/ litre		<u>0.4908</u>
1975/76 advance national average price (cents/litre <sup>5</sup> )		<u>8.3219</u>

The Town Milk Producers Federation may submit an application to Government if it requires any further consideration in the town milk price. Government refers any application to the N. Z. Milk Board for investigation and report. The Board makes investigations as it deems necessary or which may be required by Government and reports back. The final producer price for town milk is fixed by the Government.

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<sup>5</sup>Source: N. Z. Milk Board Town Milk. November 1975

The Board permits Producer Associations to adopt their own systems in the payout of town milk prices. All variations in price must average back to the national average price set by the Government. To allow for seasonal variations in milk production, the Board has established three seasonal periods. Namely spring, summer and autumn-winter.

Different price levels are set for the three periods. The level of payout provides for the autumn price to be approximately 125 per cent of the summer price and the winter price to be approximately 160 per cent of the summer price. Although the winter seasonal price is calculated on a basis of nominated quantity only, payment is made to suppliers on production up to quota plus ten per cent.

As a result of a recent amendment to the Dairy Board Act, prices for all milk products are to be fixed at the commencement of the Boards financial year (1st September 1975). The town milk price will no longer be subject to variation during the financial year, but there may be an end of season adjustment to the price.

A separate non fat pool has been established, from which any trading surplus will be distributed at the end of the financial year. Payout adjustments will be made by end of season payments from either the milk fat pool or the non fat pool. This procedure has been introduced to help stabilise milk prices to producers.

11.

## SECTION II

### THE SURVEY

### 3. SURVEY PROCEDURES

#### 3.1. Selection of Survey Sample

With the transfer of the National survey to the Agricultural Economics Research Unit at Lincoln College, and a decision to reduce sample size from that used in earlier surveys, it was decided to draw a completely new sample of farms.

Since the 1972/73 survey data was unavailable at the time, the sample selection procedure was based on 1971/72 survey data used for a profitability study<sup>6</sup>. Using the 1971/72 survey results, it was possible to calculate the standard error (S.E.)<sup>7</sup> of a number of variables given samples of different sizes<sup>8</sup>. Standard error calculations using both simple and stratified sampling was carried out for each of 22 variables of interest. The simple random sample is the most basic type of sample design but where additional information about the population is available stratified random sampling may be used and reduces sampling errors.

To exemplify the reduction in sampling error consider data from Duncraft & McArthur. The standard errors of gross farm revenue on both a sample and stratified sampling basis for a sample size of 200 farmers are:

S. E. (simple)	=	\$831
S. E. (stratified)	=	\$327

The large difference demonstrates the ability of stratified sampling to reduce the error. If the average gross farm revenue of town milk farmers from a sample of 200 farms was \$30,000 then the true average gross farm income could be expected to be \$30,000 plus or minus \$327 (i.e. \$29,673 to \$30,327).

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<sup>6</sup>Duncraft J.D. & McArthur A.T.G. "Survey of a Profitability of Town Milk Farms", Town Milk, August 1974.

<sup>7</sup>A measure of variation in a population.

<sup>8</sup>Sample sizes used: 50 through to 200 at intervals of 10.

Previous national surveys were based on a ten per cent sample of the town milk farm population thus involving about 180 - 200 farms. The survey work involved many of the Boards and Federation staff. However, the work on sampling procedures carried out by McArthur had shown that when sample size was reduced to 90 farms, the standard errors of gross farm revenue were:

S. E. (simple) for a sample of 90 farms = \$1,235

S. E. (stratified) for a sample of  
90 farms = \$488

A standard error of \$488 for gross farm revenue was regarded as accurate enough for a national survey, taking account of cost, time and efficiency. Also by reducing the sample to 90 farms, it was thought that the survey work could be carried out by one person and help reduce interview bias. Table 4 shows the standard error of some selected variables using a stratified sample of 90 farms as compared to the previous survey sample size of 180 farms.

TABLE 4

Standard Errors of Selected Variables  
(1971/72 Survey data)

Variable	Mean	S.E. Based on a sample of 90 farms	S.E. Based on a sample of 180 farms
Area of farm (Ha)	66	7.06	4.99
Milk production (L/farm)	339,079	1602	1133
Number of cows (No.)	94	2.79	1.97
Gross farm revenue (\$)	25,799	488	345
Total farm expenditure(\$)	15,719	479	339
Net farm income (\$)	10,080	332	235

Source: Duncraft & McArthur

Accordingly for the present survey it was decided that a sample of 90 farms would be satisfactory.

The sample was stratified into seven quota groups and by district.

Most town milk producers supply cities so that a total 1,743 town milk producers from the main urban supply areas of New Zealand was assumed to constitute the population. To derive a representative sample of the industry it was necessary to group farms according to the size of milk quota held in 1973. The 1973 quota list was expressed in 40 gallon intervals. However, with the introduction of metrics in 1974, it was necessary to convert these to litre intervals; 200 litre intervals were considered appropriate.

Table 5 shows the distribution of farms within each quota group (gallons) and Island necessary for a representative survey sample.

TABLE 5

Distribution of Producers Within Quota Groups  
Necessary for the Survey Sample

Quota group (gallons)	40- 80	81- 120	121- 160	161- 200	201- 240	241- 280	Over 280	All quota groups
North Island (No.)	7	14	15	10	6	2	7	61
South Island (No.)	7	9	6	3	2	1	1	29
New Zealand (No.)	14	23	21	13	8	3	3	90
Percentage of all producers	16	26	23	14	9	3	9	100

All town milk producers are given quota supply numbers by Producers' Associations. Lists of North and South Island numbers within each of the seven quota groups were compiled and the numbers randomly mixed with the aid of a computer. The computer then produced lists of numbers and the sample was drawn starting from the top of each list. The farms so drawn had then to be tested for their eligibility to be included in the survey sample.



Eligibility involved the following set of criteria:-

- (i) The farm received at least 75 per cent of gross farm revenue from milk production (this was reduced from 80 per cent in previous Town Supply farm surveys).
- (ii) All producers with less than a 40 gallon (181 litre) quota were excluded.
- (iii) Ownership was required to be uncomplicated and it was necessary that each farm could be treated as owner operated. In the case of companies, partnerships and trusts, it was necessary that conversion to assumed owner operated be carried out without much difficulty.
- (iv) The farmer agreed to participate in the survey.
- (v) The farm had been producing town milk over the entire survey period.

Representatives of the New Zealand Milk Board and the Town Milk Producers Federation initially contacted all the farmers selected from the computer list, and determined if they were eligible.

The ratio of non eligible: eligible farms drawn from the total population varied within quota group and between Islands. In general, the North Island ratio varied between three and five to one, while in the South Island the ratio was two or three to one.

The eligibility criteria might need to be re-examined by the Board and Federation.

### 3.2. Survey Method

A pilot field survey of six farms was carried out in the Canterbury District during July 1975. This was used in the normal way.

The field work commenced on 1st July, was completed by 29th November, and was carried out by one field officer.

To achieve uniformity and continuity of the survey procedure, it was decided to follow the set of instructions laid down by the New Zealand Milk Board and the Town Milk

Producers' Federation. A set of farm working accounts for the 1973/74 financial year were obtained from the farmer or his accountant. Milk production records for the farms surveyed were compiled from the local Producer Association's records.

Accounts of farms which were operated for the owner by a manager were adjusted to an owner-operated basis. Likewise, partnerships and family companies were treated as owner-operated farms by assuming one of the partners (members) as owner, and the other(s) as employee(s), provided they were regularly engaged in farm work.

All financial and production information refers to the farm's financial year. Table 6 shows the distribution of farm account balance dates among the surveyed farms. Seventy per cent of the account balance dates are on March 31st 1974.

TABLE 6

Distribution of Account Balance Dates  
In Survey Sample

	Farms with Balance Date Falling on:												
	Mar.31		Apr.30		May 31		June 30		July 31		Aug.31		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No. Farms
North Island	43	70.5	-	-	8	13.1	8	13.1	-	-	2	3.3	61
South Island	20	70.0	3	10.3	2	6.9	3	10.3	-	-	1	3.5	29
New Zealand	63	70.0	3	5.0	10	10.0	11	12.0	-	-	3	3.0	90

### 3.3. Survey Rejections

If the farm selected in the survey did not fully meet the set of criteria at the time of field interview, a farm in the same quota group and district was substituted.

The main reasons for farms being dropped from the sample at the field interview stage were:-

- (i) Town milk production for the farm did not cover an entire financial year.
- (ii) The farm accounts were too complex.
- (iii) The producer had changed his mind regarding participation in the survey.

To obtain the final sample of 90 farms, a total of 115 farmers were contacted by the field officer and 100 farms were visited.

#### 3.4. Data Assembly, Checking and Processing

In order to achieve consistency with the available information, the following steps were carried out prior to processing:

- (i) Where possible, information was transferred from the accounts to the relevant income and expenditure categories on the data assembly form. Trade discounts, subsidies and various rebates were subtracted from the appropriate expenditure item before entry.
- (ii) Since there was some variation in the content of farm accounts, it was necessary to ask the farmer to clarify a number of items. In some instances further details or confirmation was sought from the accountant.
- (iii) Stock balances were worked out in detail with the farmer. Where possible, reference was made to stock record books to assist in reconciliation. Dairy stock were classified according to age.
- (iv) The personal allowance component of car depreciation and the profit or loss made on the sale of assets were deducted (or added) from the gross depreciation to arrive at a net depreciation total.
- (v) In the case of sharemilkers or companies, where there were two or more sets of accounts for the one farm, details of each account were integrated before entering information on the data assembly form.

A statistical package<sup>9</sup> was used to process the data on the Burroughs 6700 computer of the University of Canterbury. This package has been used to calculate all statistics in this report. Computer checks are built into the programme to ensure that all variables were entered for each form, sub-totals and totals tallied, and that the coded information was accurately transferred.

#### 4. THE SAMPLE

##### 4.1. Analysis of Sample by Producer Association

The population from which the sample was drawn was confined by stratification to suppliers from 18 of the 47 Producer Associations in the country. The remainder of the Producer Associations serve only small urban areas.

Since the survey sample was also stratified by districts in each Island, there was a representative number of farms surveyed from each district. To exemplify this, Table 7 shows that 27 suppliers from the three Producer Associations serving the Auckland urban district were included in the survey. This represents 45 per cent of all town milk producers surveyed in the North Island and approximately correlates with the Auckland area proportion in the total North Island population.

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<sup>9</sup>A statistical package for the Social Sciences 1967. This is a statistical package of computer programmes developed at Stanford University and supported by Social Science Data Service of the Institute of Government Affairs at University of California, Davis, U.S.A.

TABLE 7

Distribution of Surveyed Farms by Producer  
Association and Island

Island	Producer Association	Number of farms in survey
<u>North Island</u>	Whangarei	1
	North Shore, Auckland	4
	Auckland Co-op.	4
	N. Z. Co-op, Auckland	19
	Hamilton	4
	Western Bay of Plenty	3
	Rotorua	1
	Hawkes Bay	3
	Manawatu	7
	Wanganui	3
	New Plymouth	2
	Wellington	<u>10</u>
TOTAL North Island	61	
<u>South Island</u>	Nelson	3
	Canterbury Dairy Farmers	7
	Metropolitan Milk, Christchurch	4
	South Canterbury	2
	Dunedin	7
	Southland	<u>6</u>
	TOTAL South Island	29
TOTAL New Zealand		90

Note: 7 North Island and 2 South Island farms were sharemilked.

#### 4.2. Analysis of Sample by Quota Size

The relationship between the average daily quota of farms and their total productive area is an important factor for most town milk producers. As profitability is often determined by the proportion of milk sold at town supply prices in relation to the productive area of the farm.

The reader should be careful when making comparisons among quota groups due to the small sample size and the uneven distribution of farms within the seven quota groups. The analysis by quota group is given in Appendix C.

Table 8 shows the distribution of producers by quota groups in the two Islands. The majority of suppliers are within the 401 - 600 litre group. A greater proportion of North Island farms have quota levels in excess of 600 litres than in South Island.

TABLE 8

#### Distribution of Producers by Quota Group

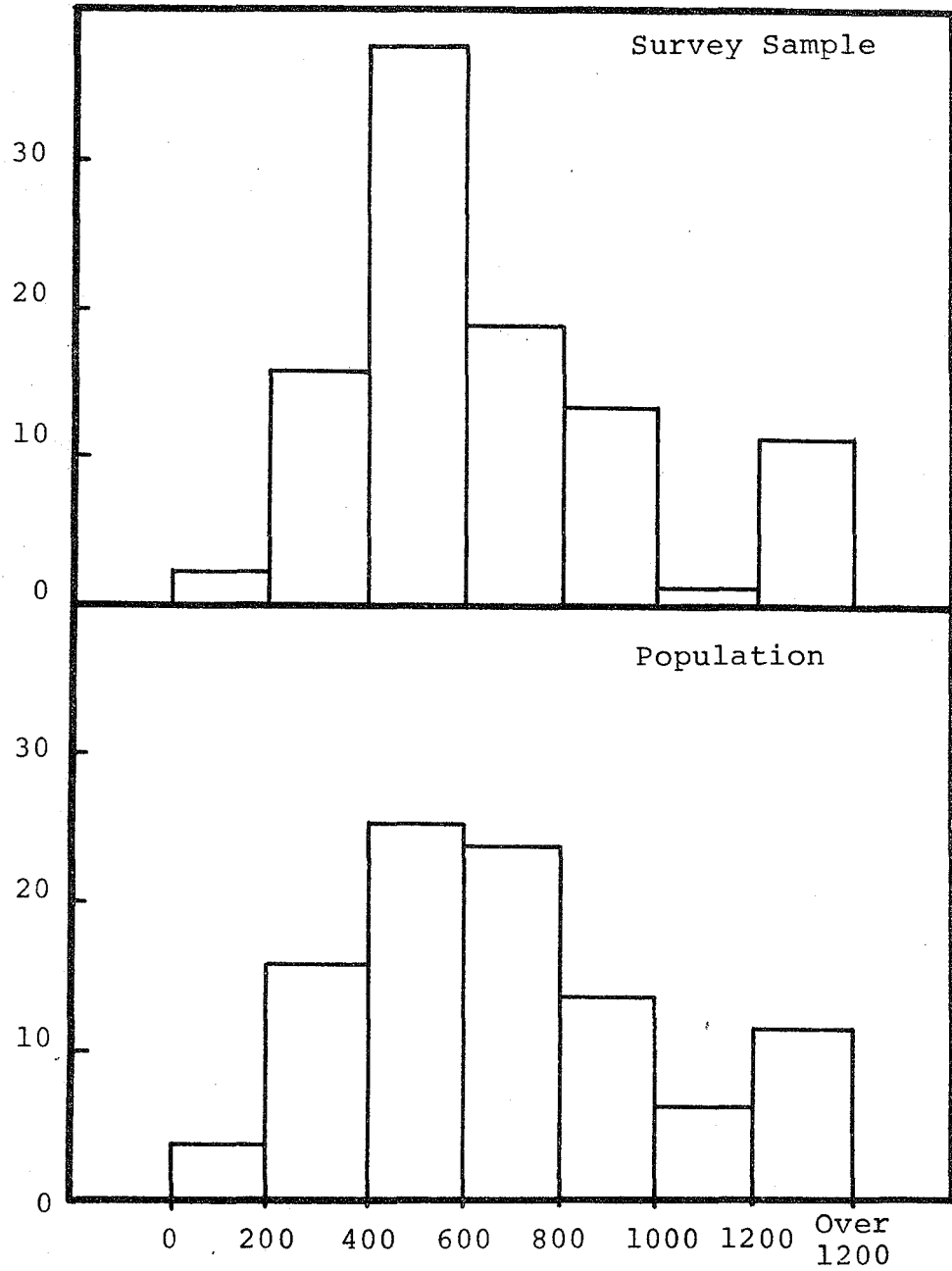
Quota Group (litres)	New Zealand		North Island		South Island	
	Number	%	Number	%	Number	%
Below 200	2	2.2	1	1.6	1	3.4
201 - 400	14	15.6	8	13.1	6	20.7
401 - 600	34	37.8	21	34.4	13	44.8
601 - 800	17	18.9	14	23.0	3	10.3
801 - 1000	12	13.3	8	13.1	4	13.8
1001 - 1200	1	1.1	1	1.6	0	0
Over 1200	10	11.1	8	13.1	2	6.9
TOTAL	90	100.0	61	100.0	29	100.0

Figure 1 compares the percentage distribution of producers by Quota Group in the survey sample with the total population.

FIGURE 1.

DISTRIBUTION OF MILK SUPPLIERS BY QUOTA GROUPS.

Proportion  
of milk  
suppliers  
(%)



Quota (litres)

It shows that the distribution by quota size of producers in the sample is similar to the distribution of suppliers in the total population. The major dissimilarity between the survey sample and the population lies in the number of 401 - 600 litre quota farms.

#### 4.3. Analysis of Sample by Herd Size

One of the more significant features of town supply dairy farming in recent years has been the steady decline in the total number of producers. Concurrently with this decline there has been an increase in herd size. The average size of herd in the 1960/61 national survey was estimated at 52 cows, while the average herd size in the 1973/74 survey is 100 cows. There has been a gradual increase in herd size over this period.

Table 9 indicates the distribution of cow herd size in the sample by quota group. In general, the farms with large quotas have larger herds, but some farms have very high quotas in relation to the milk output per cow.

Many of the suppliers with herds over 250 cows did not meet the criteria for initial sample selection due to complexities of farm ownership or the accounts.

TABLE 9

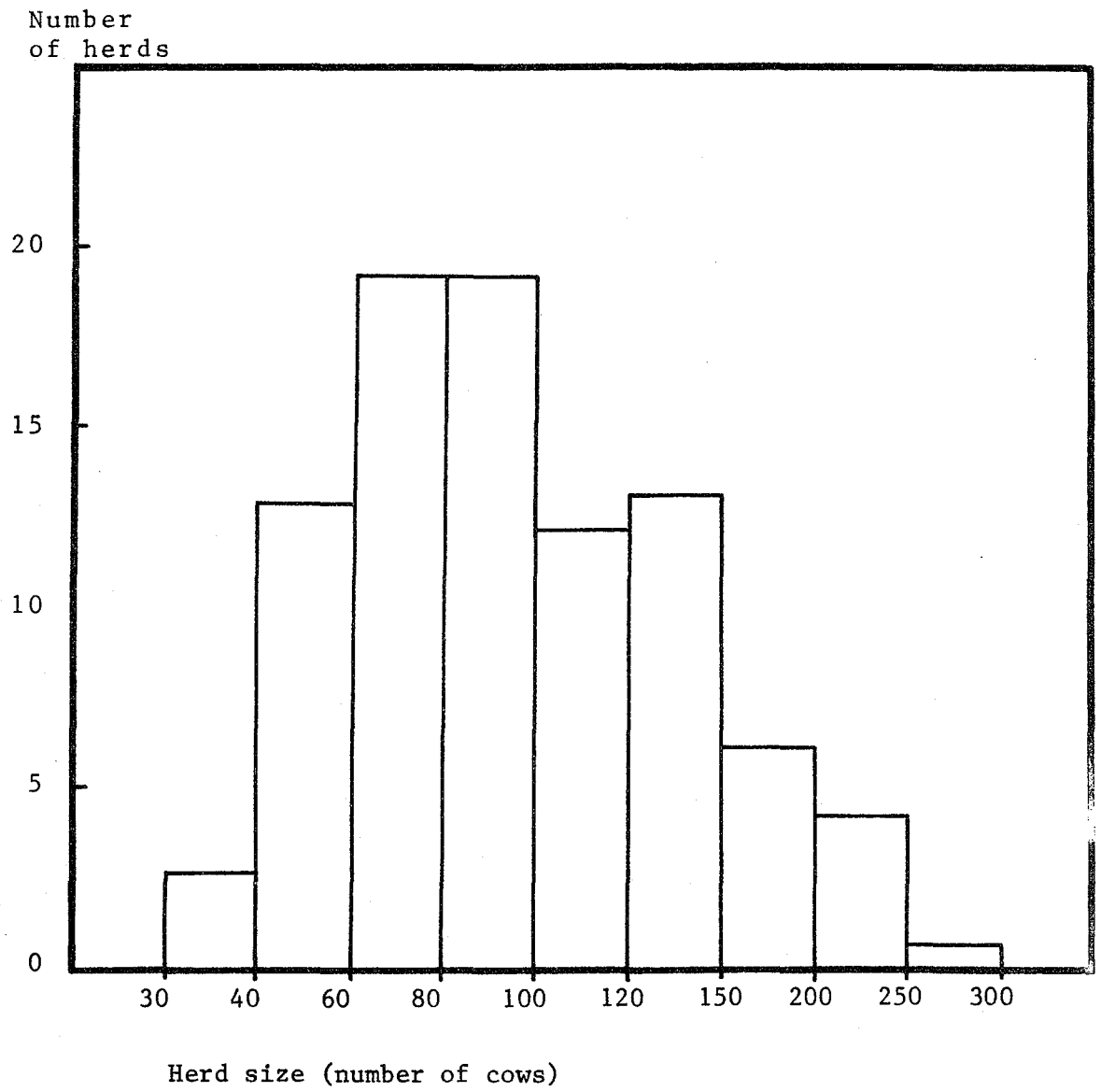
#### Distribution of Cow Herd Size by Quota Group

Quota Group (litres)	All Quota Groups	Under 200	201-400	401-600	601-800	801-1000	1001-1200	Over 1200
Average Herd Size	100	36	62	79	112	113	146	196



FIGURE 2.

DISTRIBUTION OF HERD SIZE IN SURVEY SAMPLE.



#### 4.4. Introduction to Analysis

Much of the statistical information contained in this report is presented in the form of Tables, in which average results are given on a per farm, per cow, per herd and quota size basis. Some results are presented by way of Figures for ease of comparison. Statistical analysis have been carried out where appropriate.

Due to the small sample, the reader should be careful when comparing results between North and South Islands and in particular between quota and herd size groups. The main objective of the survey was to ascertain a national net farm income.

The analysis can be used as a basis for evaluating the performance of other herds provided due regard is allowed for differences in managerial and technical characteristics. It is not intended that the data should be thought of as providing a direct guide for changes in the management of town supply herds.

The definitions and criteria adopted in the survey are outlined in detail in Appendix A.

SECTION III

PHYSICAL DATA

## 5. PHYSICAL CHARACTERISTICS OF FARMS

5.1. Farm Area and Land Use

The average area of surveyed town supply farms is shown in Table 10. Farm area gives an indication of milk output because of varying levels of development and environment. Total farm area ranged from 23 hectares to 395 hectares with a standard deviation <sup>10</sup> of 57 hectares.

TABLE 10

Farm Area

Characteristic	New Zealand	North Island	South Island
Average total area for farm (Ha)	81.7	78.1	89.1
Average productive area <sup>11</sup> of farm (Ha)	73.0	72.3	74.4
Number of farms with runoffs	24	20	4
Average ares of runoff (Ha)	9.9	12.2	4.7

The average productive area of the farm does not include any "grazing out" area used. A number of farmers "graze out" young dairy stock or cows on other farms during periods of drought or feed shortages. The arrangement is generally on a price per animal per week basis.

The majority of farms had less than three per cent unproductive farm land. Only one farm in five had a non productive area of over five hectares.

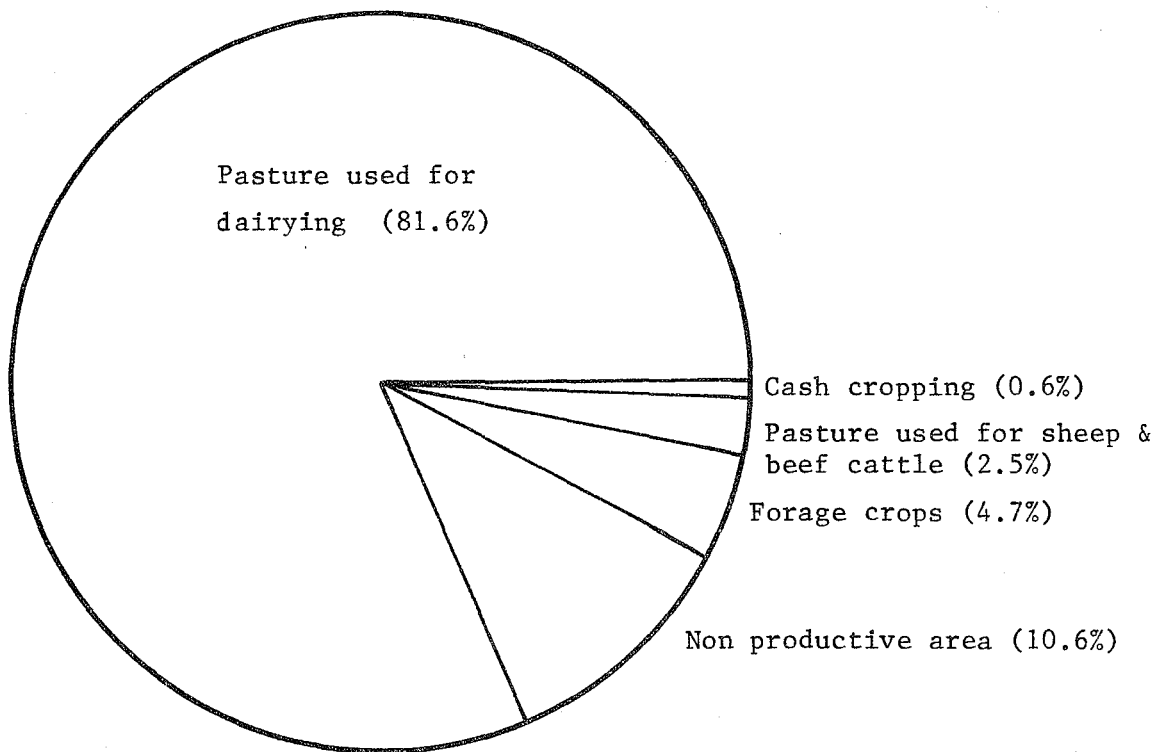
<sup>10</sup> The standard deviation measures how spread or dispersed the observations are.

<sup>11</sup> Refer to Appendix A for definition of productive area.

Ha = hectares

FIGURE 3.

DISTRIBUTION OF LAND USE ON SURVEYED FARMS.



The surveyed farms were all specialist town supply units with a major portion (approximately 85%) of the total area in grazing pasture. Forage crop area only accounted for about five per cent of the total area while cash crops took up less than one per cent.

### 5.2. Irrigated Land

Details of land under irrigation are given in Table 11. On average, North Island rainfall is sufficient to maintain grass growth for milking cows and does not warrant irrigation to ameliorate the occasional drought year. However, although recent drought years have tempted a number of suppliers in the North Island to purchase equipment, only one North Island supplier interviewed used an irrigation system during the year.

In contrast all the Nelson, Mid and North Canterbury suppliers regularly used irrigation.

TABLE 11

### Irrigated Land

	New Zealand
Proportion of farms using irrigation (%)	19
Proportion of farm area under irrigation (%)	49
Average area of farmland that can be irrigated (Ha/farm)	28
Average irrigation operating time (hours/annum)	1,380
<u>Types of Irrigation</u>	
Manual shift sprinkler (% farms)	65
Big Wheel sprinkler (% farms)	17
Tow line sprinkler (% farms)	6
Other types of sprinkler (% farms)	12

### 5.3. Soils and Topography

Town supply dairy farming is most suited to medium to heavy clay loams. Such soils are good at retaining moisture and thus can better withstand periods

of drought. Light soils dry out quickly and are then unable to support heavy stocking rates.

The five categories of soil types shown in Table 12 are intended to give an indication of the distribution of the main soil types on survey farms. Only the most predominant soil type on each farm was recorded.

TABLE 12

Soil Types

Type of soil Proportion of farms with:	Per cent of farms surveyed		
	New Zealand	North Island	South Island
Light sandy soils or sandy loams (%)	3	5	0
Silt loam soils (%)	16	13	21
Alluvial loam soils (%)	12	13	10
Clay loam soils (%)	39	42	34
Peaty and heavy clay soils (%)	30	27	35

Farms with predominantly clay loam soils formed the largest proportion. Rolling hill country with some steep gullies, predominated on 25 per cent of all farms surveyed, while the remainder were principally flat.

5.4. Ownership and Land Tenure

Like most other farm types, it appears that there is a trend towards more multiple ownership of town milk supply farm land; this being partly done to alleviate tax, death duties and so on. Sole owner operators predominate in the South Island while almost 60 per cent of the farms in the North Island are partnerships or other types of multiple ownerships.

The percentage distribution of land tenure types between the two Islands is very similar except for some Maori lease in the North Island.

TABLE 13

Distribution of Ownership and Tenure of Farms

Type of Farm Ownership	New Zealand		North Island		South Island	
	No.	%	No.	%	No.	%
Individual Owner	37	41	20	33	17	59
Partnerships:-						
A. Husband & Wife	18	20	13	21	5	17
B. Father & Son(s)	9	10	6	10	3	10
C. Two Brothers	2	2	2	3	0	0
Family company	17	19	14	23	3	10
Trust	4	5	3	5	1	4
Estate	3	3	3	5	0	0
<b>Total</b>	<b>90</b>	<b>100</b>	<b>61</b>	<b>100</b>	<b>29</b>	<b>100</b>
Type of Land Tenure (proportion of area of all farms)		%		%		%
Freehold		89		88		90
Crown Land		2		2		2
Maori Lease		8		2		0
Rented		1		8		8
<b>Total</b>		<b>100</b>		<b>100</b>		<b>100</b>



In recent years more non-farmers have been purchasing farmland close to urban boundaries either as an investment or for personal farming interest. Public companies have also shown greater interest in the purchase of farmland for farming purposes. The rapid increase in land values has forced many town supply farmers into a multiple ownership situation to ease the personal commitment.

#### 5.5. Tanker Collection and Chilling

Almost all town milk is collected in bulk tanker and the chilling of such milk on the farm is mandatory. In most instances, milk is pre-cooled through water coolers to reduce the amount of refrigeration required in the farm vats. There are four categories of farm chilling margins and allowances set by the N. Z. Milk Board, depending on the speed and type of cooling. The average chilling margin paid out to the surveyed farms was \$385 which represented 1.2 per cent of the total revenue received for milk.

The average distance of North Island farms from milk treatment stations was 28.5 kilometers while the South Island farms were 24.5 kilometers. The Board grants individual allowances to cover the cost of transport in each area, and for this reason maintains an interest in the location of new suppliers and the organisation of transport.

### 6. LABOUR

Two aspects of farm labour on town supply farms were studied: the amount of family and hired labour resources applied and the productivity per labour unit. The definitions used for determining labour units are given in Appendix A.

#### 6.1. Type of Farm Labour Employed

Only a quarter of the surveyed North Island farms employed one or more full time non family labour units continuously throughout the year, while 80 per cent employed hired labour for short periods.

The South Island situation showed that only 17 per cent of the farms employed one or more full time non family labour units during the year with family labour contributing 80 per cent of all farm labour.

Figure 4 shows the type of labour used on the surveyed farms.

#### 6.2. Labour Productivity Ratios

There are a number of frequently used measures of labour performance in a dairy enterprise; Examples of these are cows milked per man, milk output per labour unit and cows milked per labour hour.

TABLE 14

#### Labour Productivity

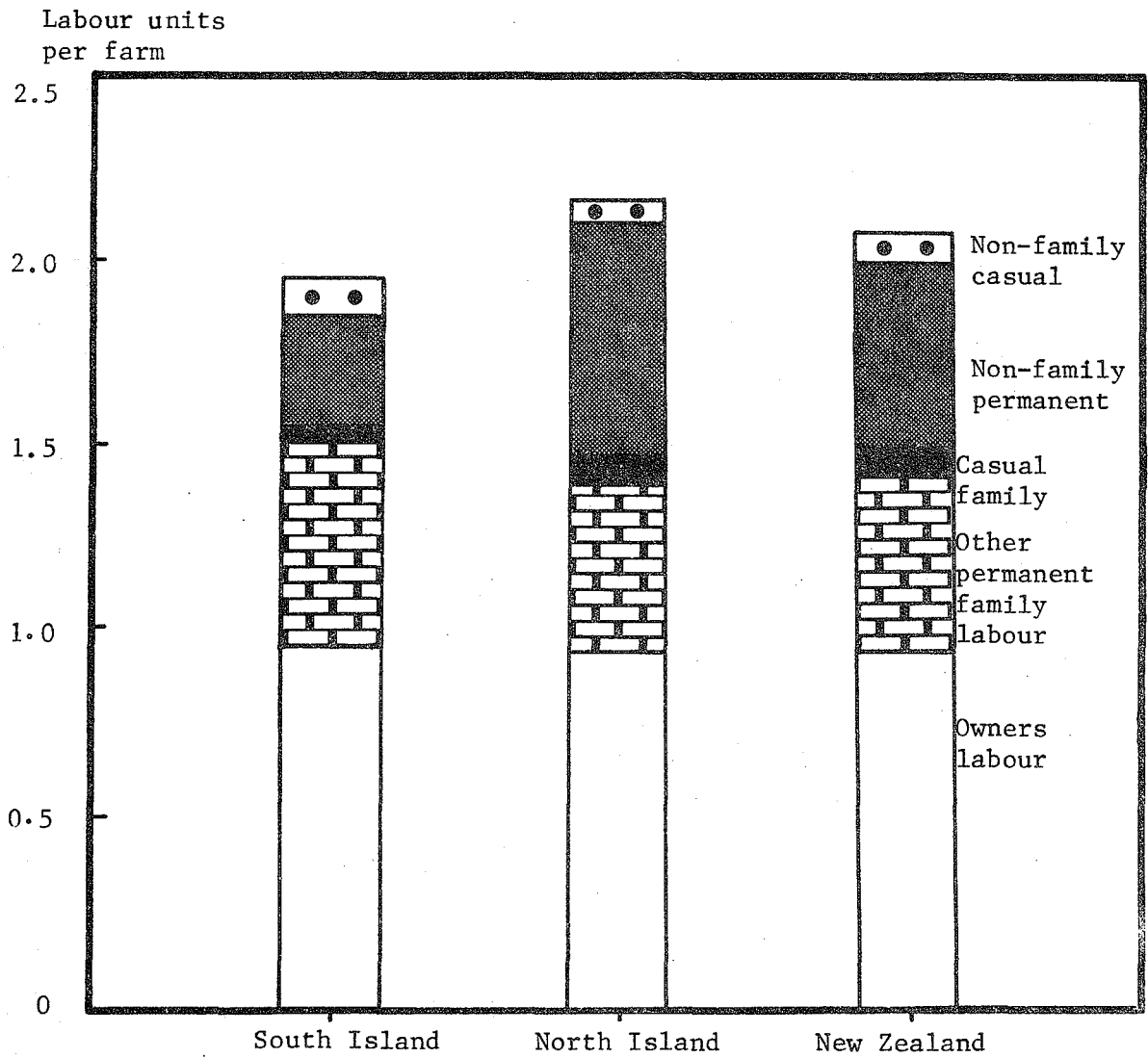
	New Zealand	North Island	South Island
Milk production (litres/labour unit)	175,854	185,019	153,386
Daily quota (litres/labour unit)	336	349	302
No. of cows per labour unit (number)	49	55	36
Livestock units (S.U./labour unit)	701	754	611
Proportion of labour units principally involved in milking (%)	76	77	73
Milk production (litres/milking labour unit)	227,379	240,180	208,867

There has been a substantial improvement in labour performance since the 1960/61 survey, mainly brought about by changes in herd sizes (100% increase), improved management techniques and higher capital investment.

The average labour performance in terms of milk produced per labour unit in 1960/61 was 94,165 litres. The 1973/74 survey results show that a labour unit produced 175,844 litres of milk, an increase of 87 per cent over 1960/61.

FIGURE 4.

TYPE OF LABOUR EMPLOYED.



Milk production per labour unit is also affected by breed type, quality of stock and the milking method used.

Figure 5 shows that as herd size increase there is an increasing proportion of non family labour employed.

A separate study of labour on North Island farms was carried out. The study concluded that as labour unit input increased from 1 to 1.75 units there was increasing milk output per labour unit. Output per labour unit then dropped significantly on farms with from 1.75 to 3 labour units. It is suggested that farms with around this labour input tend not to increase their cow numbers or improve their production techniques as much as larger farms (above 3 labour units). Farms in the latter group produced the greatest amount of milk per labour unit. This may be partly explained by the fact that farms with a high labour input are more capital intensive and have more modern milking equipment and so on.

Figure 6 shows the relationship of milk output and labour input on North Island farms and Figure 7 relates labour to quota milk and productive farm area.

Productivity per labour unit on North Island farms is at least 20 per cent higher than on South Island farms. The fact that a smaller proportion of total labour is involved in milking work on South Island farms may explain some of the difference. The movement of irrigation equipment over a five to six month period and additional fodder cropping contribute towards a higher total input on South Island farms.

The analysis in Table 15 indicates that as herd size increases there is also an increase in the labour costs per cow up to the 200 - 249 cow herd size after which labour costs per cow decline.

The increase in labour costs per cow can be partly explained by the fact that there is an increasing proportion of non-family labour employed on these farms. Owner operators wages are not included in labour costs which include the cost of all hired, family and non-family labour, unpaid family labour at imputed costs and the cost of various ancillary labour benefits.

FIGURE 5.

RELATIONSHIP BETWEEN TYPE OF LABOUR UNITS AND HERD SIZE.

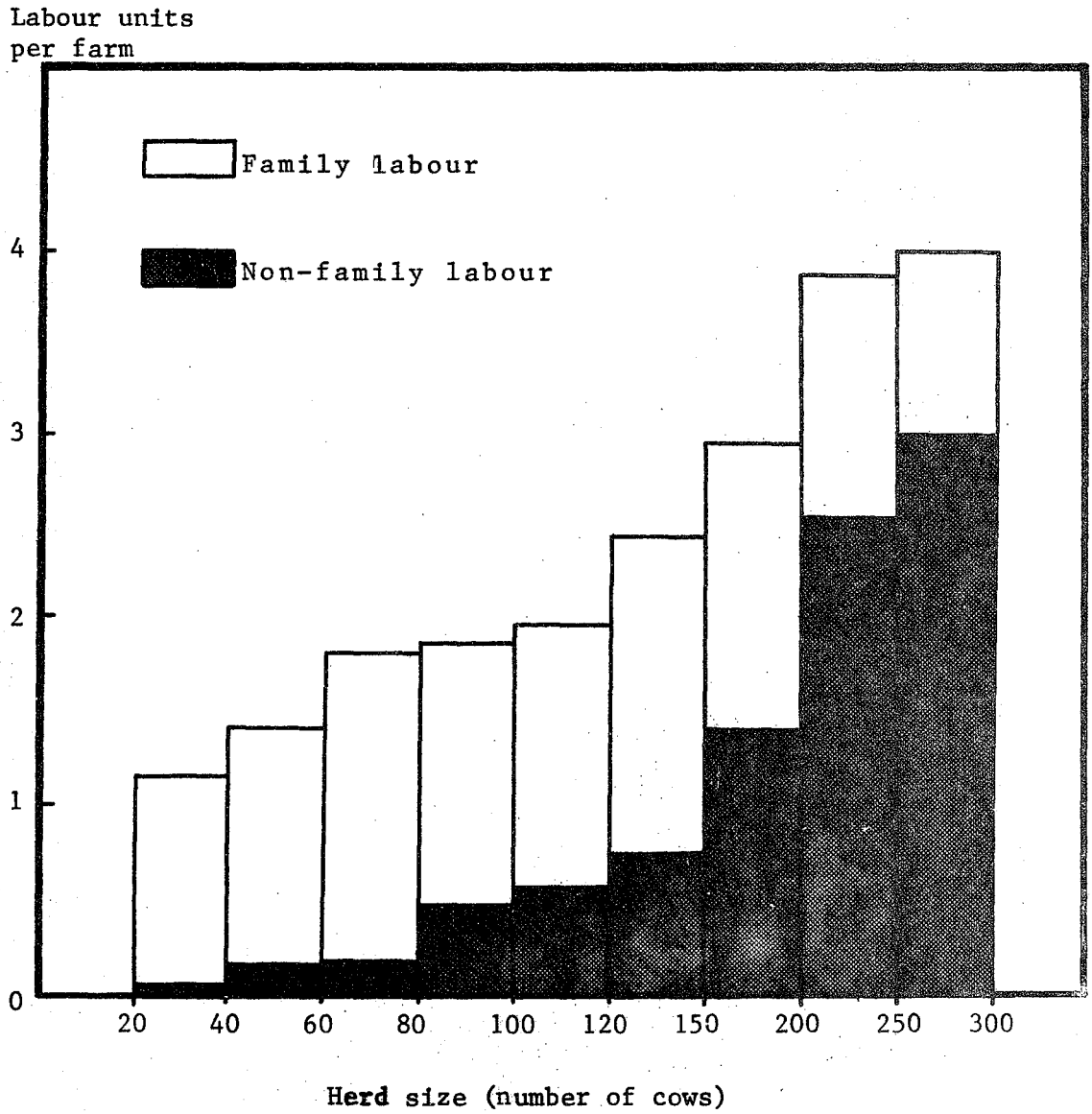


FIGURE 6.

OUTPUT OF MILK PER LABOUR UNIT ON  
NORTH ISLAND FARMS.

Annual milk  
output per  
labour unit  
( '1000 litres)

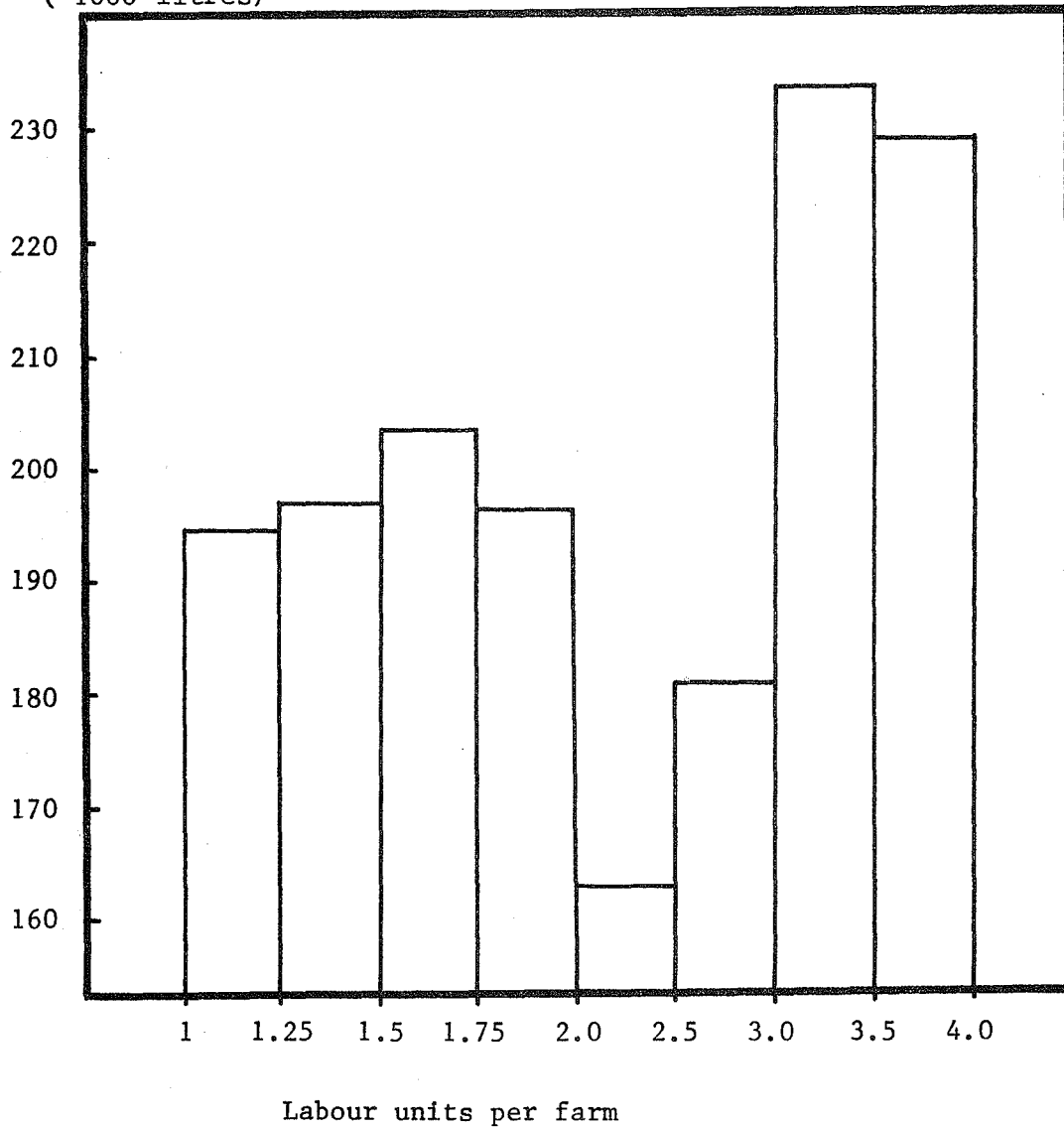


FIGURE 7.

DAILY QUOTA PER LABOUR UNIT.

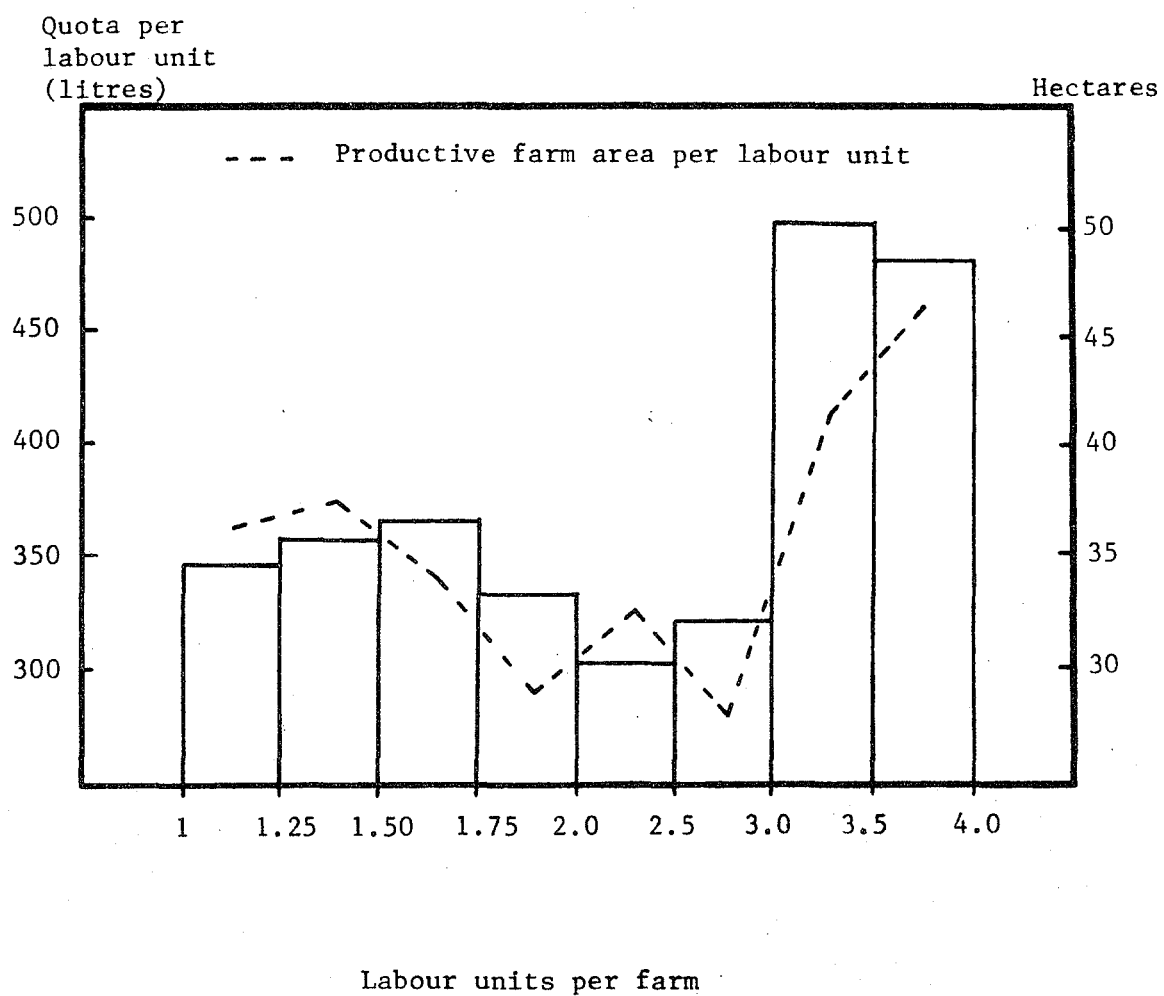


TABLE 15

Labour Costs by Herd Size per Farm, per Cow and per Productive Hectare

Herd Size	No. of farms	Average number of labour units employed	Per cent of non-family labour employed	Labour costs		
				Per farm (\$)	Per cow (\$)	Per prod. Ha. (\$)
30 - 39	3	1.15	3	703	22.32	20.47
40 - 59	13	1.39	11	1433	29.73	24.08
60 - 79	19	1.80	9	3177	46.24	49.59
80 - 99	19	1.85	22	3375	38.14	62.47
100 - 119	12	1.96	30	5140	47.63	69.84
120 - 149	13	2.40	32	7497	55.41	80.09
150 - 199	6	2.91	50	13759	80.18	136.46
200 - 249	4	3.80	69	17340	74.10	107.15



## 7. HERD CHARACTERISTICS

7.1. Breeds of Dairy Cattle

The proportion of different breeds of dairy cows on the surveyed farms is shown in Table 16.

TABLE 16  
Breeds of Dairy Cattle

	New Zealand	North Island	South Island
	% all cows	% all cows	% all cows
Friesian	85.4	80.1	96.5
Jersey	1.6	2.2	0.6
Jersey - Friesian Cross	10.4	14.0	2.9
Other Breeds	2.6	3.7	0

7.2. Use of Artificial Breeding

Data collected from the surveyed farms shows that much greater use is made of artificial breeding in the North Island than in the South Island. (Table 17). An average of only half of the cows on farms that use artificial breeding are actually artificially inseminated, the remainder being put to the bull.

TABLE 17  
Use of AB Service

	New Zealand	North Island	South Island
Proportion of farms using AB Service (%)	76.0	84.0	59.0
Proportion of cows on farms using AB Service mated artificially (%)	52.3	63.4	28.8
Proportion of farms using nominated service (%)	19.0	18.0	21.0

### 7.3. Use of Herd Testing

Herd testing can be carried out monthly, bi-monthly or by a system of production ranking. The monthly system was the most predominant. The proportion of North Island farms using herd testing was 48 per cent while in the South Island it was 52 per cent.

Figure 8 shows that there is a significant difference in the average milk production per farm and per cow with and without herd testing.

The South Island Herd Improvement Association fee in 1974/75 for monthly herd testing was \$15 per herd plus \$2.25 per cow with a minimum fee of \$60 for 20 cows. The charge for bi-monthly testing is less. The Auckland Herd Improvement Association fee in 1974/75 was \$30 per herd and \$2.32 per cow for monthly testing.

### 7.4. Dairy Stock Balances

The all year round calving pattern and the owners difficulty in identifying the ages of certain classes of stock made the assignment of stock units into the correct classes difficult. Data collected on stock balances is given in Tables 18 to 20.<sup>12</sup>

The livestock profit from beef cattle and sheep trading only accounted for about four per cent of the total livestock profit. Most of the beef cattle and sheep were located on South Island farms.

Cow death rates were particularly high on some farms due to disease. Hill country farms also reported a number of deaths arising from cows falling into steep gullies and ravines.

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<sup>12</sup>Stock numbers and values are rounded to nearest whole number.

FIGURE 8.

COMPARISON OF LEVELS OF PRODUCTIVITY BETWEEN HERDS  
WITH AND WITHOUT HERD TESTING.

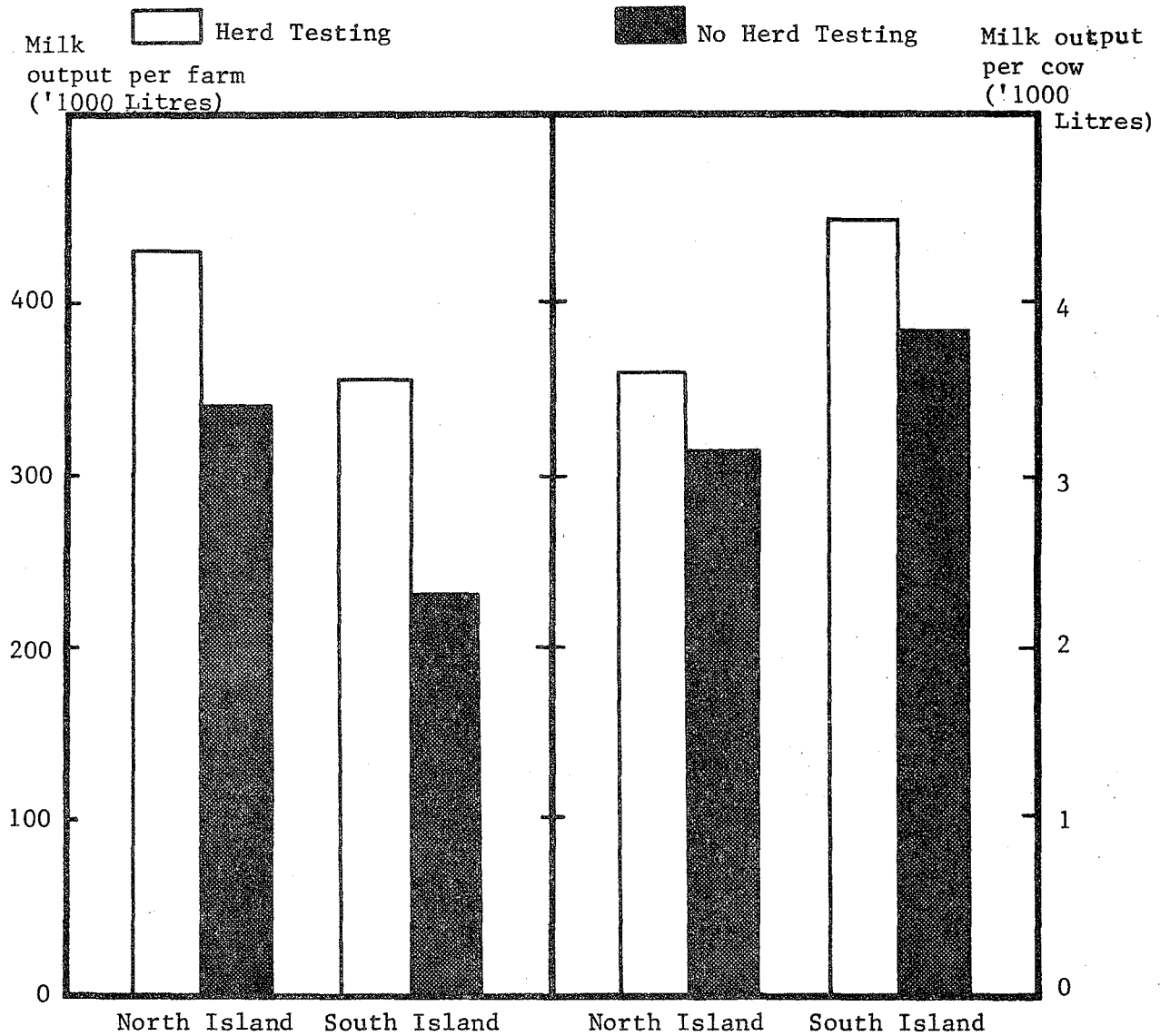


TABLE 18

Dairy Stock Balances for North and South Island Farms

	North Island		South Island			North Island		South Island	
Opening stock	Avg.No. per farm	Value \$	Avg.No. per farm	Value \$	Closing stock	Avg.No. per farm	Value \$	Avg.No. per farm	Value \$
All cows	113	14,172	68	8,530	All cows	115	14,344	72	8,974
Heifers-in-calf	7	685	7	662	Heifers-in-calf	7	680	8	841
1-2 year heifers	16	1,310	8	643	1-2 heifers	16	1,305	10	772
Yearlings	16	834	17	869	Yearlings	19	949	14	678
Calves	22	436	18	367	Calves	18	366	17	330
Bulls	2	322	2	359	Bulls	2	344	2	324
Young bulls	1	98	1	30	Young bulls	1	112	1	76
Sub Total	117	17,848	120	11,460	Sub Total	178	18,100	123	11,995
<u>Purchases</u>					<u>Sales</u>				
Cows	5	795	5	1,047	Cows	25	2,802	15	2,040
Other Dairy	4	521	3	740	Other Dairy	4	436	4	933
Sub Total	9	1,316	8	1,787	Sub Total	29	3,238	19	2,973
Calves reared	26	-	19	-	Deaths, killers, etc	5	-	5	-
Opening Total	212	19,164	147	13,247	Bobby calves sold	(65)	1,135	(34)	640
Livestock Profit	-	3,309	-	2,361					
Opening Balance	212	22,473	147	15,608	Closing Total	212	22,473	147	15,608

Note: Stock numbers and values are rounded to nearest whole number.  
 Figures in brackets are not included in stock balance.

TABLE 19 Dairy Stock Balance for all Farms

New Zealand	Avg.No. per farm	Value \$	New Zealand	Avg.No. per farm	Value \$
<u>Opening Stock</u>			<u>Closing Stock</u>		
All cows	99	12,354	All cows	101	12,614
Heifers-in-calf	6	678	Heifers-in-calf	7	732
1-2 year heifers	13	1,089	1-2 years heifers	14	1,133
Yearlings	16	845	Yearlings	18	862
Calves	21	414	Calves	18	354
Bulls	2	333	Bulls	2	338
Young bulls	1	77	Young bulls	1	100
Sub Total	158	15,790	Sub Total	161	16,133
<u>Purchases</u>			<u>Sales</u>		
Cows	5	876	Cows	21	2,557
Other Dairy	4	592	Other Dairy	4	596
Sub Total	9	1,468	Sub Total	25	3,153
Calves reared	24	-	Deaths,killers,etc	5	-
Opening Total	191	17,258	Bobby calves sold	(55)	976
Livestock Profit	-	3,004			
Balance	191	20,262	Closing Total	191	20,262

TABLE 20 Beef and Sheep Stock Balance for all Farms

New Zealand	No.	Value	New Zealand	No.	Value
<u>Opening Stock</u>			<u>Closing Stock</u>		
All sheep	22	111	All sheep	31	155
All beef cattle	1	83	All beef cattle	4	220
Sub Total	23	194	Sub Total	35	375
<u>All Purchases</u>	30	600	<u>All Sales</u>	30	545
Reared replacements	15	-	Deaths,killer,etc.	3	-
<u>Opening Total</u>	68	794			
Livestock Profit	-	126			
<u>Balance</u>	68	920	<u>Closing Total</u>	68	920

Note: Figures in brackets are not included in stock balances.

## 8. PRODUCTION

8.1. Milk Production

Details of milk production on the surveyed farms is given in Table 21.

TABLE 21

Milk Production

	New Zealand	North Island	South Island
Daily quota (litres/farm)	682	730	580
Total annual milk production (litres/farm)	356,985	386,690	294,502
Milk production (litres/cow)	3,570	3,392	4,207
Dairy milk production (litres/farm)	978	1,059	807
Milk annual output (litres/productive Ha)	4,890	5,348	3,958
Milk annual output (litres/labour unit)	175,854	185,019	153,386

8.2. Seasonal Pattern of Milk Production

Each producer has to regulate his calving pattern so that sufficient milk is produced each month to fulfil his quota, shortfalls in quota level are penalised. The quantity of surplus milk which attracts the town milk price depends on the overall supply and the pricing policy of the Producer Association applying at that particular time of the year.

Over the past three or four years the proportion of total milk produced that is used for town supply has remained fairly constant.

Table 22 summarises the proportion of total milk sold at town milk price.

TABLE 22

Proportion of Milk Sold at Town Milk Price

	New Zealand	North Island	South Island
Quantity produced for town milk (litres/farm)	278,835	301,384	231,404
Quantity of surplus milk produced (litres/farm)	78,150	85,306	63,098
Proportion of total production used for town supply (%)	78.1	77.9	78.6
Proportion of total production used for surplus milk (%)	21.9	22.1	21.4

Table 23 shows the proportion of total milk produced per month by region. The monthly milk production records for each farm were aggregated into ten regions. Southland and Taranaki producers appear to produce a greater proportion of summer milk compared with the other regions, while Canterbury producers supply the highest proportion of winter milk.

TABLE 23

Distribution of the Proportion of Total Milk  
Produced per Month by Region

Month	Northland N.Auckland	South Auckland	Waikato Bay of Plenty	Hawkes Bay	Wellington Manawatu	Taranaki Wanganui
	%	%	%	%	%	%
April	6.4	6.9	6.7	6.6	7.2	6.6
May	7.1	7.1	6.4	6.3	7.1	6.1
June	7.5	7.5	6.2	6.6	7.0	6.4
July	7.6	7.9	6.9	6.7	7.2	6.7
Aug.	8.0	8.9	8.0	6.9	7.8	7.0
Sept.	9.5	10.2	10.0	9.0	9.4	9.6
Oct.	10.9	10.3	11.4	10.8	10.7	12.1
Nov.	11.1	10.4	11.6	11.7	10.5	12.4
Dec.	10.0	9.6	10.6	10.7	9.7	10.8
Jan.	8.4	7.4	8.6	9.5	8.6	8.5
Feb.	7.2	7.1	6.9	7.8	7.6	7.0
Mar.	6.3	6.7	6.7	7.4	7.2	6.9
Total	100.0	100.0	100.0	100.0	100.0	100.0
Month	Canterbury	Dunedin	Southland	Nelson		
	%	%	%	%		
April	7.9	6.9	6.5	6.4		
May	7.3	6.5	6.6	7.1		
June	7.9	6.3	6.6	7.4		
July	8.3	6.1	5.4	7.4		
Aug.	8.3	6.5	6.6	8.0		
Sept.	9.4	8.4	8.7	9.4		
Oct.	10.1	10.9	11.6	10.8		
Nov.	9.3	11.5	12.1	10.2		
Dec.	8.2	11.1	11.1	9.1		
Jan.	7.6	9.8	9.5	8.7		
Feb.	7.4	8.6	7.8	7.7		
Mar.	7.6	7.4	7.5	7.8		
Total	100.0	100.0	100.0	100.0		



The seasonality of milk output is important to the profitability of town supply dairy farming. The general seasonality of milk production throughout the year for the North and South Islands is shown in Figure 9. Monthly milk production records for each farm were divided by the average number of cows on the farm for the year; thus giving an average milk production per cow per month. The North and South Islands monthly deviation from the national average was then calculated.

The effects of severe drought in many North Island regions probably explains the large difference between Islands in per cow production in the summer - autumn period of that year.

Figure 10 highlights the main regional differences in seasonality of milk production. The monthly average milk production per herd in each region was subtracted from the average monthly production over the whole year for that region to determine a measure of the seasonal effects. The sample was not large enough to include all regions.

Reference to Figure 10 shows that the Wellington district monthly average milk supply to be closest to the New Zealand average. It appears that of the total milk produced in the year, Canterbury suppliers produced a higher proportion of winter milk compared with suppliers from Wellington and Auckland regions. Monthly milk production for all farms reaches a peak during October and November, showing that a large number of farms not included in the three main regions have a greater supply of spring and summer milk. The physical and climatic environment of different areas may be expected to play an important part in determining the seasonal pattern of milk output.

Data concerning the proportion of milk sold at surplus prices by quota group is given in Table 24. Farms have been subdivided into quota groups for a number of reasons. Historically, the Milk Board has always examined the profitability of town milk supply farms by quota groups.

FIGURE 9.

SEASONALITY OF MILK PRODUCTION PER COW ON  
NORTH AND SOUTH ISLAND FARMS.

Deviation from  
national average  
(litres/cow/day)

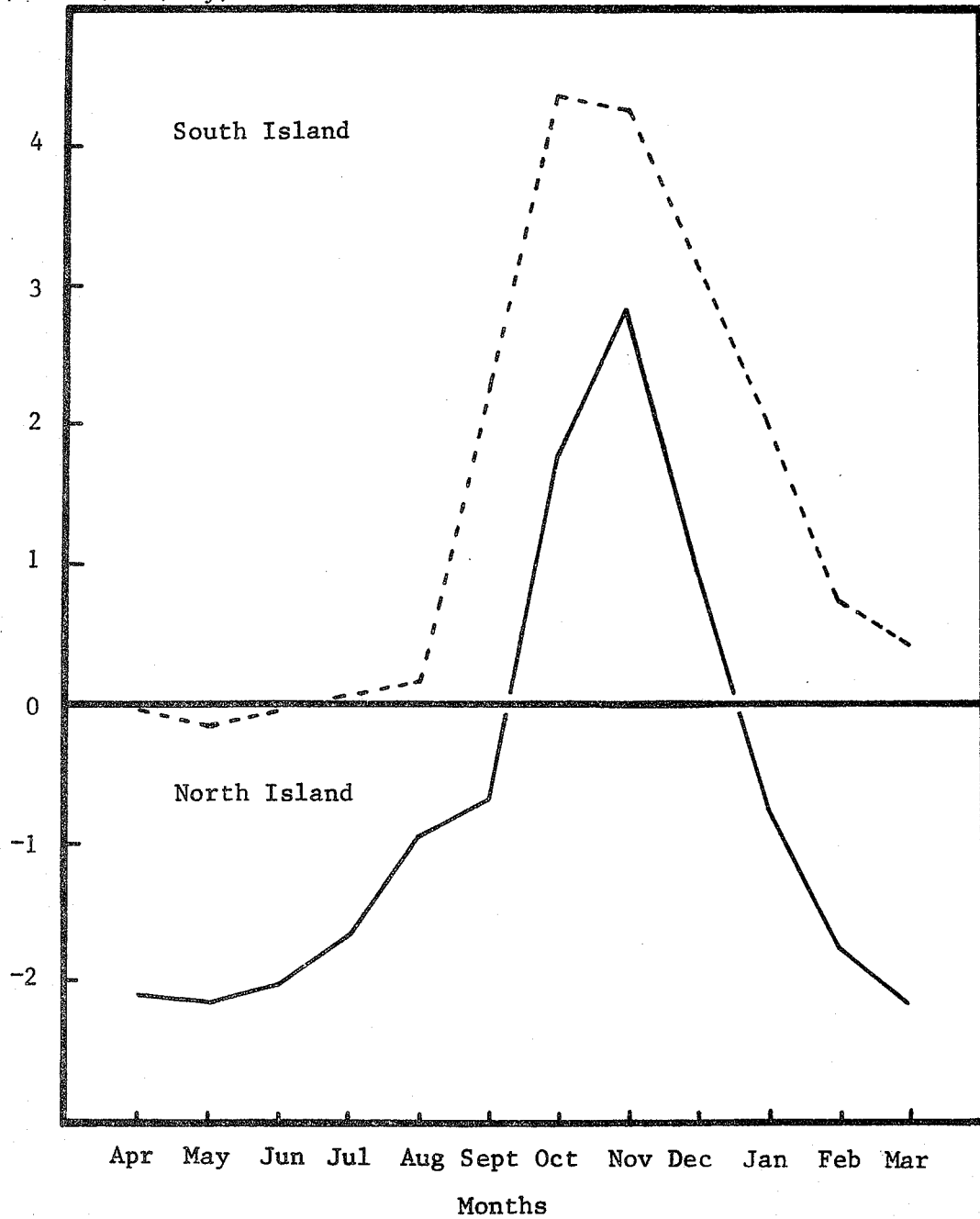
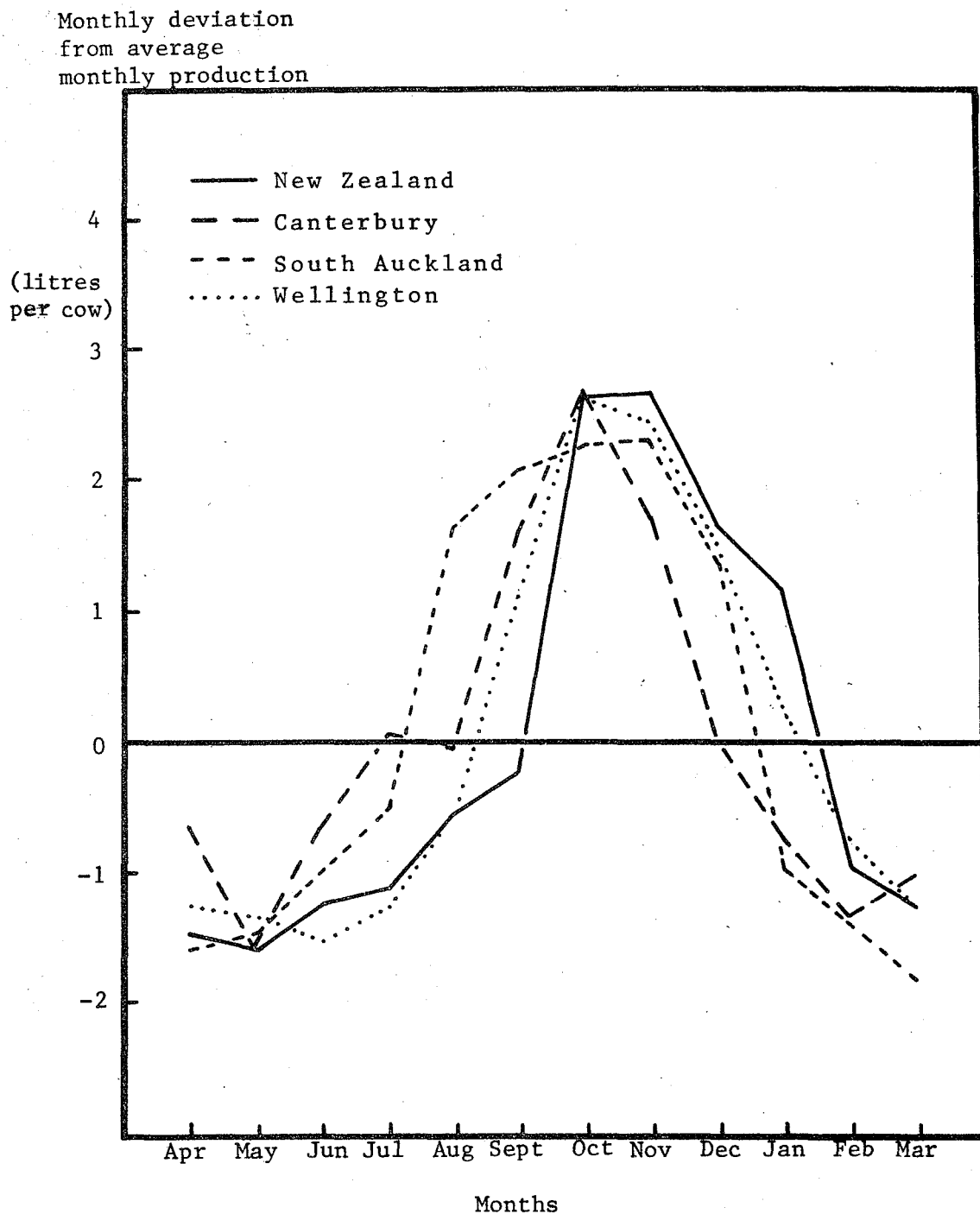


FIGURE 10.

SEASONAL EFFECTS OF MILK PRODUCTION ON A REGIONAL  
BASIS.



It is relatively easy to make broad comparisons between the different sized quota groups, particularly where there are a large number of farms within each group. With the reduction in the sample size and a need to keep the quota groups relatively large, it becomes more difficult to make meaningful comparisons between groups.

TABLE 24

Proportion of Total Milk Sold at  
Surplus Milk Prices by Quota Size

Quota Group (litres)	Under 200	201-400	401-600	601-800	801-1000	1001-1200	Over 1200
Per cent of milk sold at surplus milk prices	35.3	26.6	24.9	25.5	15.5	13.0	17.2

The larger quota holders sell a smaller proportion of total milk at surplus prices. Hence, one would expect the net profit per hectare to rise with larger quota.

### 8.3. Milk Quality

Town milk producers are penalised for milk below acceptable quality standards. Town milk is divided into three quality grades, finest, first and second. Finest quality milk is that which passes a six hour reductable test and has at least 3.5 per cent milk fat. The grading is done by sampling at milk treatment stations. In 1973/74, 97.5 per cent of milk tested for keeping quality was finest quality milk. Milk quality may also be affected by the content of antibiotics, sediment, added water and so on.

The survey results for milk quality are set out in Table 25. It was noted on the survey that a few producers incurred considerable penalties as a result of milk quality.

TABLE 25

Milk Quality

	New Zealand	North Island	South Island
Per cent of finest Quality milk	98.16	98.43	97.58
Per cent of first quality milk	1.57	1.41	1.93
Per cent of second quality milk	0.27	0.16	0.49
Per cent of milk with less than 8.5% solids-not-fat	2.50	1.73	3.86

8.4. Productivity Ratios

There is a tendency for milk output per hectare to decline as the productive area of the farm increases. In comparing milk production per cow and herd size, no clear pattern emerged from the analysis. In general, milk production per cow in the North Island farms declined with increasing herd size up to 150 cow herds and then increased significantly for herds greater than 150 cows.

## 9. MANAGEMENT CHARACTERISTICS

An overview of some management characteristics is summarised in this section.

9.1. Yard Management

Developments in the design of milking equipment and shed layout have taken place over the last few years. A number of farmers are now operating automatic rotary milking units with automatic cup removers. Nevertheless, there are farmers milking cows in very out dated types of sheds, although these are adequate from the hygiene point of view. The number of cows handled per labour unit is often greatly affected by the type of milking shed.

The Walk-Through (Internal Race) remains the most common type of milking shed in New Zealand. Rotary milking sheds have become more widespread, particularly in

in the North Island. The average number of pairs of cupsets per shed has remained about the same for the last four years.

The number of people normally involved in the milking operation was recorded, and it was noted that a South Island labour unit in the shed milks about 50 cows, while in the North Island it is around 70 cows. A number of factors can partly explain this difference: larger herds on North Island farms, a higher proportion of paid and non-paid family labour on South Island farms and in general milking plant and equipment is more modern on North Island farms.

The efficient disposal of effluent has recently become an important feature of management. Due to the introduction of regulations for effluent control, there is now more need to develop systems for efficient disposal. A system of settling tanks or ponds is proving to be efficient on farms where there is sufficient fall. An important factor constraining the rapid improvement of modern effluent disposal systems is the high capital cost required for the installation. A summary of the main types of systems found on the surveyed farms is given in Table 26. The disposal of effluent into a sump or pond is the most common method. One fifth of North Island farms dispose their effluent into streams.

## 9.2 Topdressing

Practically all farms applied phosphatic fertiliser to pastures, either in the form of superphosphate, potassic super (most predominant type), various phosphate blends, and liquid or fowl manure. About one quarter of farmers applied some form of nitrogenous fertiliser mainly in the form of urea.

Topdressing data are summarised in Tables 27 and 28.

TABLE 26

Yard Management

Characteristic	New Zealand	North Island	South Island
<u>Type of Effluent</u>	(% farms using each system)		
<u>Disposal System</u>			
Spray irrigation	27	20	41
Pumping onto pasture	14	20	3
Through sumps, ponds	32	31	35
Into streams, water courses	16	20	7
Cartage from shed	6	6	3
Other systems <sup>1</sup>	5	3	11
Total	100	100	100
<u>Type of Cowshed</u>			
<u>In Use</u>			
Herringbone	42	48	31
Walk-through	47	39	62
Rotary	6	8	3
All others <sup>2</sup>	5	5	4
Total	100	100	100
<u>Features Relating to Shed</u>			
Age of cowshed (Yrs)	12	11	15
No. of pairs of cupsets	9	9	7
No. of milkers normally in shed (labour units)	1.54	1.61	1.41

<sup>1</sup>Includes settling tanks.<sup>2</sup>Includes tandem and abreast type of parlours.

TABLE 27

Topdressing

	New Zealand	North Island	South Island
Fertiliser application (tonnes per farm) <sup>1</sup>	50	66	28
Lime application (tonnes per farm)	20	24	12
Proportion of farms which applied no fertiliser (%)	4	3	7
Productive area of farm topdressed (Ha/farm)	73.0	72.3	74.4
Average fertiliser application per productive Ha. (Kg/Ha)	680	823	380

<sup>1</sup>Not including liquid or poultry manure.

TABLE 28

Fertiliser Application by Herd Size

Herd Size	Phosphate Fertiliser per productive Ha (Kg./Ha)	Nitrogenous Fertiliser per Productive Ha. (Kg./Ha)	Total Fertiliser per Productive Ha. (Kg./Ha)
30 - 39	370	0	370
40 - 59	220	100	320
60 - 79	430	160	590
80 - 99	570	120	690
100 - 119	630	170	800
120 - 149	470	160	630
150 - 199	750	110	860
200 - 249	730	130	860

Table 28 indicates that farms with larger herds have a higher rate of fertiliser application per hectare.



### 9.3. Supplementary Feeding

Purchased supplementary feedstuffs accounted for about 12 per cent of total expenses incurred on the surveyed farms. Expenditure on dairy meal was a very important item on many North Island farms during the year, particularly in those areas that experienced drought.

Basic data concerning the type and quantity of feedstuffs used is presented in Table 29. Great reliance is placed on hay. Practically all North Island farms feed silage; whereas only a small proportion South Island farms use it.

An analysis of North Island farms compared herds that were fed dairy meal or grain with herds not fed meal or grain.<sup>13</sup> Approximately 80 per cent of the farms were feeding either dairy meal and/or grain during 1973/74. It was noted that these farms were 25 per cent larger in area and quota size was approximately 40 per cent larger. Figure 11 compares the levels of milk production per cow and net farm income per farm for herds with and without meal and grain feeding. Only five of the 41 farms feeding meal were also feeding some grain. There were seven farms feeding grain only.

Figure 11 indicates that dairy meal and grain feeding was profitable under North Island conditions in the 1973/74 year. However, many of the farms who fed dairy meal or grain only did so because of the drought conditions and the limited supply of forage crops.

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<sup>13</sup> North Island farms were analysed as there was greater uniformity of feed and management. In any case only a few South Island farms were feeding dairy meal.

TABLE 29

Feed Production, Purchase and Use

	New Zealand	North Island	South Island
<u>Hay Usage</u>			
Proportion farmers feeding hay (%)	98.9	98.4	100
Total no.of bales hay made per farm	3230	2418	4967
Total no.of bales purchased per farm	706	637	851
Total no.hay bales used	3945	3055	5818
Per cent lucerne hay	10	3	24
<u>Silage Usage</u>			
Proportion farmers making silage (%)	66	90	24
Total quantity of silage made per farm (tonnes)	204	264	78
Per cent pasture silage of all silage made	93	93	91
<u>Straw Usage</u>			
Per cent farmers feeding straw	13	5	31
No.of bales of staw made	83	20	217
No.of bales of staw purchased	12	0	37
Per cent Ryegrass straw of all straw bales used.	77	100	78
<u>Forage Crops</u>			
Per cent farmers growing forage crops	70	62	86
Average area of forage crops grown per farm (Ha)	3.91	2.5	6.9
Average per cent of forage area used for growing:Choumoellier	34	23	42
Green maize	18	34	7
Fodder beet	3	1	4

continued....

Table 29 - continued

	New Zealand North Island South Island		
Swedes and turnips	16	28	7
Oats-barley greenfeed	13	0	23
Other <sup>1</sup>	16	14	17
Total	100	100	100
Average estimated yield of choumoellier <sup>2</sup> (tonnes/farm)	352	222	472
Average estimated yield of green maize (tonnes/farm) <sup>3</sup>	351	400	253
<u>Cereals and Dairy Meal</u>			
Per cent of farms growing grain for feed	17	0	52
Per cent of farms purchasing grain for feed	19	16	28
Per cent of farms feeding dairy meal	50	67	14
Dairy Meal fed p.a. per farm (tonnes) on farms feeding meal	17	25	1.5
Barley fed p.a. per farm on farms feeding grain (tonnes)	16	19	14

<sup>1</sup>Includes Tama - Ryegrass mixtures, Sudax.

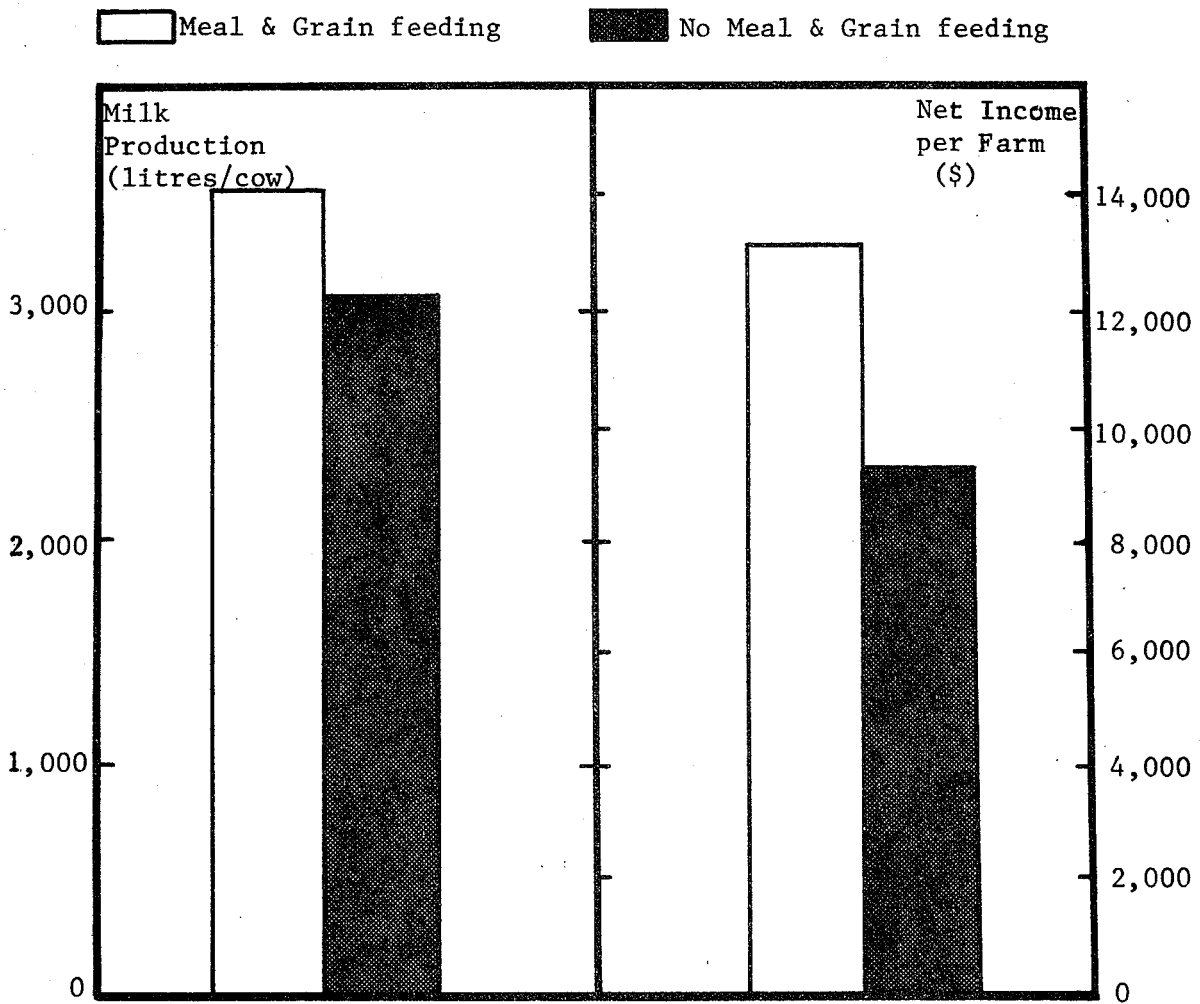
<sup>2</sup>21% of N.I. and 48% of S.I. farms grew Choumoellier

<sup>3</sup>20% of N.I. and 21% of S.I. farms grew green maize.

p.a. = per annum

FIGURE 11.

MILK PRODUCTION FOR NORTH ISLAND FARMS FEEDING SOME MEAL AND GRAIN COMPARED WITH THOSE NOT FEEDING MEAL AND GRAIN.



The average meal and grain costs per cow were calculated for both North and South Islands. It was assumed that the bulk of meal and grain were fed between the months of January and August. Taking the average cost of dairy meal to be \$90 per tonne in 1973/74, the quantity of meal fed per cow for all herds which were fed meal was 223 kilograms. Therefore the average cost per cow of meal feeding was approximately \$20. The extra milk production on farms feeding meal and grain was approximately 400 litres per cow and with the average North Island milk price of 8.6904 cents per litre, the extra milk gives additional gross income of \$34.76 per cow.

SECTION IV

FINANCIAL DATA

## 10. FARM ASSETS

10.1. Analysis of Farm Assets

The method of valuation of capital items and the treatment of various capital items in examining the assets of the surveyed farms are described in Appendix A.

As in surveys of previous years, a complete breakdown on the capital structure of farms was not carried out. Details of the average capital value of the surveyed farms are shown in Table 30.

TABLE 30

Value of Farm Assets

	New Zealand		North Island		South Island	
Capital structure	Average		Average		Average	
	per	per	per	per	per	per
	farm	cow	farm	cow	farm	cow
	\$	\$	\$	\$	\$	\$
<u>Land &amp; Buildings</u>						
Land & Improvements	126,110	1,261	134,015	1,176	110,029	1,572
Farmer's house	1,907	19	2,000	18	1,714	24
Other farm houses	3,218	32	3,152	28	3,356	48
Farm buildings	5,466	55	4,815	42	6,835	98
Sub-total	136,701	1,367	143,982	1,263	121,933	1,742
<u>Plant, Vehicles &amp; Stock</u>						
Plant & Equipment	4,143	41	3,862	34	4,732	68
Vehicles	5,133	51	5,410	47	4,547	65
Dairy Stock	18,753	188	20,811	183	14,424	206
Other Stock	835	8	639	6	1,247	18
Sub-total	28,864	288	30,722	270	24,950	356
<u>Miscellaneous</u>						
Company shares	658	6	501	4	976	14
Working capital	1,729	17	1,902	17	1,363	19
Sub-total	2,387	24	2,403	21	2,339	33
Total value of assets.	167,952	1,679	177,107	1,554	149,223	2,132

The results of Table 31 show a considerable difference in the capital value of North and South Island farms, the major difference being in the value of land and improvements. On a productive hectare basis, there is a 22 per cent greater value of farm assets on North Island farms.

Estimates can be made of the capital invested in dairy cows and in dairy plant and equipment; these are shown by national herd size groups in Table 32. Dairy stock valuations are the average of opening and closing book values. Since all dairy stock was valued at standard values, no account was taken of the quality of stock. The valuations of dairy plant and equipment are the average of opening and closing inventories valued at historic cost and not at current prices. The values in the Table are therefore considerably below what would be required to set up a new unit under current prices. Table 31 does show that as herd size increases, the total capital investment in dairy stock and equipment on a per cow basis declines. Herd sizes under 80 cows are considerably more capital intensive on a per cow and equipment basis than larger herds. Investment in dairy stock and equipment per cow on farms with greater than 80 cows is relatively constant on a per cow basis.

TABLE 31  
Capital Invested in Dairy Stock and  
Dairy Equipment by Herd Size Groups

Herd Size	Total Capital Invested in Dairy stock & equipment	Capital invested per cow in:		
		Dairy Stock \$	Dairy Equipment \$	Total \$
	\$			
30 - 39	9,698	235	73	308
40 - 59	13,165	207	66	273
60 - 79	17,911	204	57	261
80 - 99	18,415	173	35	208
100 - 119	24,343	186	40	226
120 - 149	29,505	185	33	218
150 - 199	36,525	178	35	213
200 - 249	51,668	187	34	221
All herds	22,896	188	41	229



There was no significant relationship between the total value of assets per farm and milk output or labour per hectare.

#### 10.2. Long and Short Term Liabilities

Long and short term liabilities of farms are summarised in Table 32. Levels of indebtedness varied widely on the surveyed farms; some were debt free while others only had a 10 to 15 per cent equity.

TABLE 32

#### Current and Long Term Liabilities

	New Zealand per farm \$	Zealand per cow \$	North Island per farm \$	North Island per cow \$	South Island per farm \$	South Island per cow \$
Current Liabilities	5,594	56	5,835	51	5,087	73
Long Term Liabilities	29,332	293	28,065	246	32,000	457
Total Liabilities	34,926	349	33,900	297	37,087	530
Total Value of Assets	167,952	1,679	177,107	1,554	149,223	2,132
Total Liabilities as a per cent of total assets	21	-	19	-	25	-

### 11. GROSS FARM REVENUE

#### 11.1. Introduction

Definitions relating to the calculation of gross farm income are given in Appendix A. As indicated earlier, a criterion for inclusion in the survey sample was that more than 75 per cent of gross income of a farm had to come from the sale of milk. Sources of gross farm revenue for the surveyed farms are shown in Table 33.

TABLE 33

Gross Farm Revenue

Gross Farm Revenue	New Zealand		North Island		South Island	
	Average per farm \$	Average per cow \$	Average per farm \$	Average per cow \$	Average per farm \$	Average per cow \$
<u>Total Milk Revenue</u>	31,471	314.71	33,605	294.78	26,981	385.44
<u>Other Income</u>						
Produce sold <sup>1</sup>	98	0.98	0	0	305	4.36
Wool & skins	108	1.08	69	0.61	191	2.73
Contracting	151	1.51	137	1.20	182	2.60
Miscellaneous Income <sup>2</sup>	79	0.79	39	0.34	165	2.36
Produce Used	94	0.94	109	0.96	63	0.90
Employers house rent	546	5.46	685	6.01	253	3.61
Rent & lease fees	198	1.98	212	1.86	171	2.44
Total Other Income	1,274	12.74	1,251	10.97	1,330	19.00
<u>Livestock Profit</u>	3,130	31.30	3,393	29.76	2,580	36.86
<u>Gross Farm Revenue</u>	35,875	358.75	38,249	335.52	30,891	441.30
Other income as a proportion of total milk revenue (%)	4.0		3.7		4.9	

<sup>1</sup>Produce sold includes sales of grain, seed, fruit, and vegetables.

<sup>2</sup>Miscellaneous income includes sales of hay, silage, fodder, fertiliser and interest received from a Dairy Company.

Other income accounted for less than four per cent of the gross revenue on all farms. When the imputed values of produce used and employees house rent are deducted, other income accounts for less than two per cent.

#### 11.2. Milk Prices Received

Details of the 1973/74 national milk prices have been given in section 2.3. Each Producer Association adjusts its own method of payment according to its supply policy. By adjusting end of season and surplus income payouts to the suppliers, Companies are able to operate some form of price stabilisation. Deductions may also be made for major development projects. Some back payments and bonuses from the 1972/73 year were paid in the 1973/74 year and so were included in the gross revenue for the latter year.

The average milk price received for all milk supplied during the 1973/74 season can be calculated by dividing the total quantity of milk produced by the gross payout for milk.

The results are:-

New Zealand	8.8158	cents per litre
North Island	8.6904	cents per litre
South Island	9.1616	cents per litre

#### 12. FARM EXPENDITURE

The various costs incurred on town supply dairy farms are itemised in Table 34. Farm costs varied widely between farms of similar herd sizes. Expenditure per litre of milk produced is given in Appendix C.

##### 12.1. Cost Components per Farm and per Cow

The expenditure per cow on South Island farms is considerably higher than on North Island farms. This is mainly a result of lower stocking rates and higher irrigation costs. The method used to calculate average expenditure per cow is a simple average for each Island and does not take differing herd sizes into account. This technique has been used in previous Survey Reports and is probably adequate for general purposes.

TABLE 34 Total Farm Expenditure

Farm Expenditure	New Zealand		North Island		South Island	
	Average per farm \$	Average per cow \$	Average per farm \$	Average per cow \$	Average per farm \$	Average per cow \$
<u>Farm Labour Costs</u>						
Permanent labour	3,974	39.74	4,482	39.32	2,906	41.51
Family casual labour	119	1.19	148	1.30	57	0.81
Non-family casual labour	272	2.72	242	2.12	336	4.81
Labour accomodation	690	6.90	799	7.01	458	6.54
Unpaid family labour	309	3.09	341	2.99	242	3.46
Sub-total	5,364	53.64	6,012	52.74	4,000	57.14
<u>General Operating Costs</u>						
Contracting	622	6.22	677	5.94	504	7.20
Repairs & maintenance	1,984	19.84	2,034	17.84	1,877	26.81
Fertiliser & lime	1,835	19.35	2,178	19.11	1,115	15.93
Weed & pest control	162	1.62	187	1.64	108	1.54
Seeds	281	2.81	258	2.26	330	4.71
Feed - fodder	882	8.82	832	7.30	987	14.10
" meal & grain	1,449	14.49	1,955	17.15	384	5.49
" calf feed & minerals	259	2.59	318	2.79	133	1.90
Freight	307	3.07	227	1.99	472	6.76
Shed power	407	4.07	461	4.04	293	4.19
Shed requisites	333	3.33	309	2.71	384	5.49
Animal health	433	4.33	500	4.39	294	4.20
Breeding fees	206	2.06	259	2.27	93	1.33
Herd testing fees	92	0.92	97	0.85	82	1.17
Sub-total	9,252	92.52	10,292	90.28	7,057	100.82
Irrigation costs	108	1.08	10	0.09	316	4.51
Vehicle costs	1,423	14.23	1,422	12.47	1,428	20.40
Total operating costs	10,783	107.83	11,724	102.84	8,801	125.73
<u>Administration costs</u>						
Accountancy	216	2.16	244	2.14	154	2.20
Telephone	167	1.67	185	1.62	130	1.86
General admin.	317	3.17	343	3.01	261	3.73
Sub-total	700	7.00	772	6.77	545	7.79
<u>Overheads</u>						
Insurance	254	2.54	237	2.08	291	4.16
Rates	543	5.43	553	4.85	523	7.47
Rent	1,062	10.62	1,310	11.49	542	7.74
Interest Paid	2,445	24.45	2,624	23.02	2,068	29.54
Sub-total	4,304	43.04	4,724	41.44	3,424	48.91

Continued....

Table 34 continued:

Farm Expenditure	New Zealand		North Island		South Island	
	Average per farm \$	Average per cow \$	Average per farm \$	Average per cow \$	Average per farm \$	Average per cow \$
Total cash expenses	21,151	211.51	23,232	203.78	16,770	239.57
Net depreciation	2,200	22.00	2,213	19.42	2,173	31.04
Total farm expenditure	23,351	233.51	25,445	223.20	18,943	270.61

12.2. Cost Components by Herd Size

TABLE 35

Farm Expenditure by Herd Size

Herd Size Group	20-39	40-59	60-79	80-99	100-119	120-149	150-199	200-249
Average no. cows in herd	32	48	69	89	108	135	172	234
Number of herds in group	3	13	19	19	12	13	6	4
Total farm expenditure (\$)	10,354	11,977	17,558	17,697	23,182	30,537	43,061	62,633
Average expenditure per cow (\$)	324	250	254	199	215	226	250	268

The average farm expenditure per cow by herd size follows a similar pattern to the average farm expenditure per cow by quota size groups (Table 46 in Appendix B). As herd size increases up to 100 cows, average expenditure per cow declines, showing some economy of scale but beyond this size, costs per cow increase. The increase in costs on the farms with larger herds is partly explained by the fact that a greater proportion of non family labour is employed on these farms; total labour costs accounted for 38% of total expenditure compared to 15 - 20% for the smaller herds.

12.3. Relative Importance of Principal Farm Expenditure Components

The relative importance of various expenditure components is presented in Table 36 and Figure 12.

TABLE 36

Relative Importance of Various Cost Components

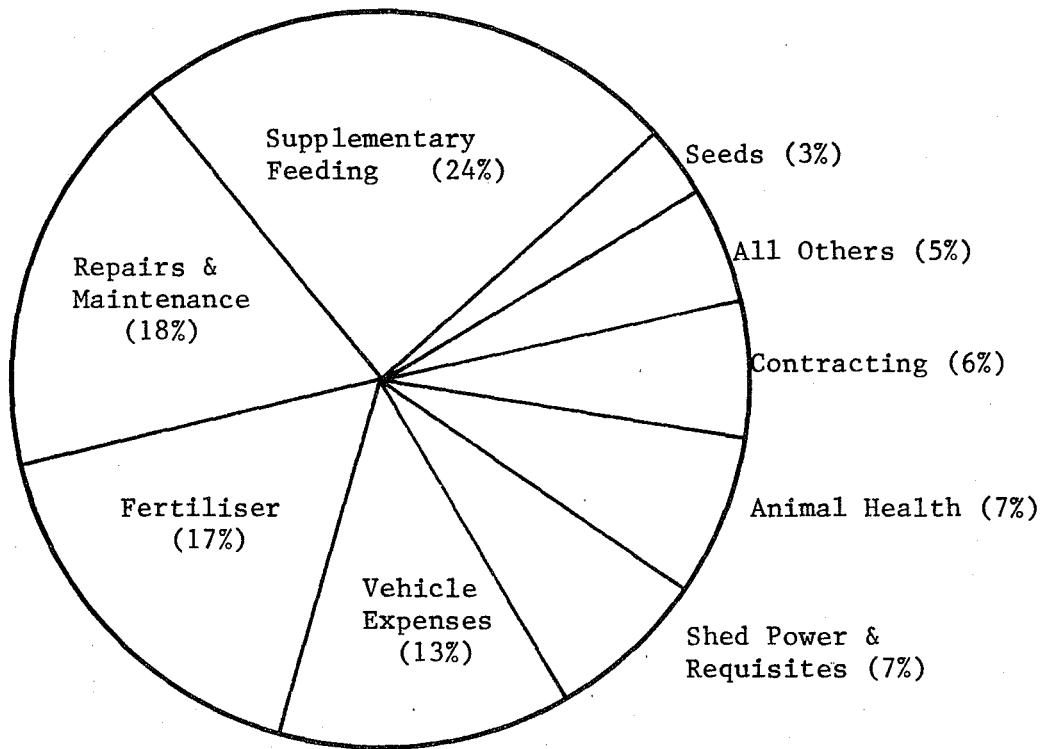
	New Zealand %	North Island %	South Island %
<u>Total Farm Expenditure</u>			
Labour costs	23.0	23.6	21.0
Operating costs	39.6	40.5	37.3
Irrigation costs	0.5	0.0	1.7
Vehicle costs	6.0	5.6	7.6
Administration costs	3.0	3.0	2.9
Overhead costs	10.5	18.6	18.0
Total cash expenses	90.6	91.3	88.5
Depreciation	9.4	8.7	11.5
Total Farm Expenditure	100.0	100.0	100.0

13. NET FARM INCOME

Net farm income is defined as the return to the operator before taxation for his labour, management and capital used. It is obtained by subtracting the total farm expenditure from the gross farm revenue.

FIGURE 12.

RELATIVE IMPORTANCE OF ITEMS IN OPERATING COSTS  
(NEW ZEALAND).



13.1. Net Farm Income per Island

TABLE 37

Net Farm Income

	New Zealand		North Island		South Island	
Net farm income	Average per farm \$	per cow \$	Average per farm \$	per cow \$	Average per farm \$	per cow \$
Gross farm revenues	35,875	358.75	38,249	335.52	30,891	441.30
Total farm expenditure	23,351	233.51	25,445	223.20	18,943	270.61
Net farm income or return to labour, management & capital.	12,524	125.24	12,804	112.32	11,948	170.69

The national net farm income represents a return of approximately 7.5 per cent on the total "updated" value of assets employed. Note however that a wage of management has not been deducted from net farm income so return on capital is higher than if this had been done.

13.2 Net Farm Income Using Imputed Interest Rates

An estimate of net farm income (as previously defined) with varying rates of imputed interest on the total value of farm assets in place of interest paid, are as follows:-



TABLE 38

Net Farm Income Using Imputed Interest Rates

Imputed rate of interest	Net Income					
	New Zealand		North Island		South Island	
	Average		Average		Average	
	per farm	per cow	per farm	per cow	per farm	per cow
	\$	\$	\$	\$	\$	\$
3½%	9,091	90.91	9,232	80.98	8,793	125.61
5%	6,571	65.71	6,573	57.66	6,555	93.64
6%	4,892	48.92	4,807	42.16	5,063	72.32
10%	-1,826	-18.26	-2,274	-19.95	-906	-12.94

The actual interest paid on the total capital value of land, buildings, plant, vehicles and stock only amounted to an average of 1.5 per cent for all farms.

The current rate of interest on borrowed capital from the Rural Banking Corporation is 7% on first mortgages up to \$45,000 and 8% thereafter.

### 13.3. Net Farm Income by Herd Size

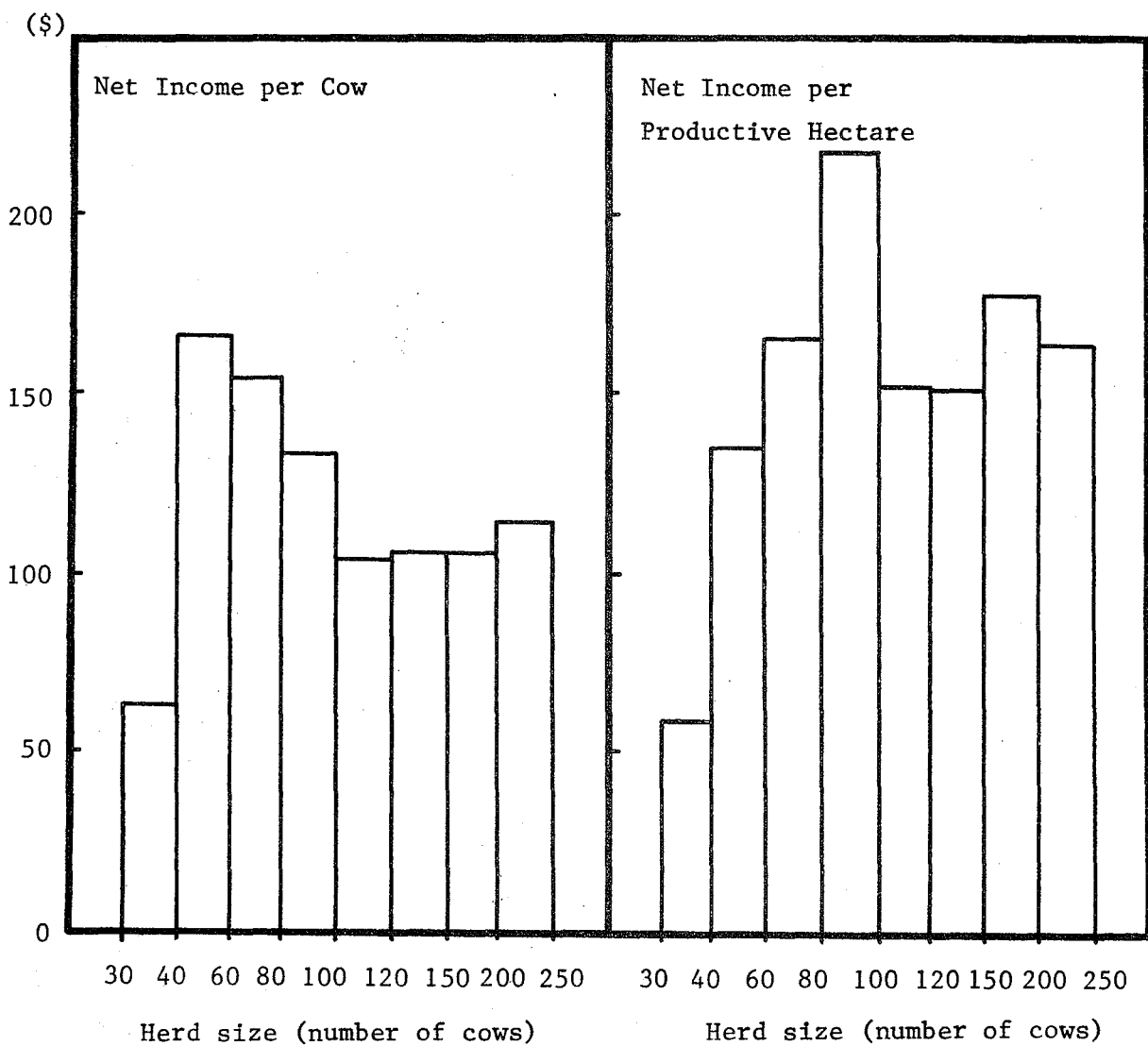
The relationship between herd size and net farm income (as defined in section 13.1.) is shown in Figure 13. The average net farm income by herd size is given per cow and per productive hectare. The 250 - 299 herd size category has been eliminated due to the small number of farms in this category.

Net farm income per productive hectare is at a maximum in the 80 - 99 herd size, while the peak return per cow is in the 40 - 59 herd size. The level of net farm income per cow and per productive hectare is relatively constant at herd sizes greater than 100. It is not possible to comment on herds over 250 cows due to the small sample size. A factory supply survey (1972/73) of the New Zealand Dairy Board<sup>13</sup> showed a declining rate of average net farm income per cow

<sup>13</sup> Economic Survey of Factory Supply Farms in N.Z. N.Z.M.B. 1972/73.

FIGURE 13.

NET FARM INCOME PER COW AND PER PRODUCTIVE HECTARE  
FOR VARYING HERD SIZES.



and per kilogram of milkfat produced in herd groups over 200 cows.

13.4. Net Farm Income by Stock Units

All livestock per farm were converted to livestock units according to methods described in Appendix A. Table 39 gives the distribution of net farm income for different categories of total stock units.

TABLE 39

Net Farm Income by Stock Units

Net farm income	Stock Units per farm					Total
	0 - 1000	1001- 2000	2001- 3000	3001- 4000	Over 4001	
Under \$1,999	2	0	0	0	1	3
\$2,000-\$4,999	3	5	0	0	0	8
\$5,000-\$7,999	10	10	0	0	0	20
\$8,000-\$10,999	3	8	1	0	0	12
\$11,000-\$13,999	0	10	2	0	0	12
\$14,000-\$16,999	5	7	1	2	0	15
over \$17,000	1	11	3	5	0	20
Total	24	51	7	7	1	90

Twentyfive per cent of the farms with under 1,000 stock units had incomes in excess of \$14,000. High levels of profitability can be attained from small units.

SECTION V

COMPARISONS, SUMMARY  
AND CONCLUSIONS.

## 14. TRENDS AND COMPARISONS

14.1. Comparisons with Survey Results of Previous Years

In order to demonstrate trends in production and farm incomes, data from previous years' surveys have been extracted and are presented along with 1973/74 results in Table 40.

TABLE 40

Comparison with Survey Results of Previous Years  
(Year ending 31st March)

	1960/61	1970/71	1971/72	1972/73	1973/74
Productive farm area (Ha)	41.3	63.5	66.0	74.9	73.0
Daily quota (litres/farm)	336	600	641	682	682
No. of cows per farm	54	91	93	100	100
Milk production per cow (L)	2,973	3,450	3,628	3,628	3,570
Total milk production per farm (L)	160,209	314,626	339,079	362,746	356,985
Total assets employed per farm (\$)	17,790	66,807	77,034	95,552	167,952
Total assets employed per cow (\$)	330	734	828	956	1,680
Gross revenues per farm (\$)	4,421	20,431	25,789	31,800	35,875
Gross revenues per cow (\$)	82	224	276	317	359
Total expenditure per farm (\$)	2,919	13,574	15,723	19,564	23,351
Total expenditure per cow (\$)	54	149	168	195	234
Net income per farm (\$)	1,502	6,857	10,066	12,236	12,524
Net income per cow (\$)	28	75	108	122	125
Milk output per labour unit (litres/labour unit)	93,813	177,757	210,608	176,947	175,854

A number of important trends are apparent over the 1970/71 to 1973/74 period. Firstly, the average productive area of town supply farms has increased over the period and is now 15 per cent larger. Secondly, the average number of cows per productive farm hectare has increased by about five per cent. Thirdly, capital assets have increased by 151 per cent reflecting significant increases in land values. Fourthly, gross revenue per farm has increased by 75 per cent and expenditure by 72 per cent with a resulting increase in net income of 83 per cent. Milk output per labour unit has remained static except for 1971/72.

14.2. Comparisons with other New Zealand Dairy Surveys

There are two other annual national surveys on dairy farming in New Zealand. The N. Z. Dairy Board publishes its results in a bulletin called "An Economic Survey of Factory Supply Dairy Farms in New Zealand." Its report includes data on the average income per factory supply farm (with and without sharemilkers) herd size and various aspects of production. The net farm income for factory supply farms was \$8,588 in the year ending 31st May 1974.

The Department of Statistics publishes, "The Average Income of Town Milk Producers" in the Annual Incomes and Income Tax Bulletin. The purpose of this sample survey is to obtain representative average figures of the incomes and expenses of milk for town supply. The definition of net income is governed by the legal provisions of the Land and Income Act 1954. The net income per farmer for taxation purposes for the year ending 31st March 1974 was \$10,744.<sup>14</sup> The average herd size was noted to be 97 cows and the quota to be 611 litres per day, milk production per cow was estimated to be only 3,118 litres.

The different criteria adopted and the survey techniques used are different for each of the Surveys.

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<sup>14</sup>N. Z. Dept. of Statistics, Incomes & Income Tax to 1973/74.

## SUMMARY AND CONCLUSIONS

This Report contains detailed information about town milk production in New Zealand and is intended to be useful to all those with a professional interest in the subject. While the principal objective of the Survey was to determine the average net farm income being received by town milk producers, other information regarding industry structure and management has been presented.

The survey conclusions are briefly summarised as follows:-

(i) Financial Aspects

The net average net farm income for the 90 surveyed farms for the year ending March 31st 1974 was \$12,524. The net farm income for North Island farms was \$12,804 and South Island farms \$11,948. The comparable figures for the 1972/73 survey were \$12,236, \$12,911 and \$10,741 (Net farm income is defined as the difference between the gross farm revenue and total farm expenditure and has been calculated according to the instruction manual of the Board and Federation).

Comparing 1972/73 and 1973/74 gross farm revenue increase from \$31,800 to \$35,875 and total farm expenditure from \$19,564 to \$23,351. Livestock trading profit declined by \$675 to \$3,130 in 1973/74. The decline in stock values in this period partly explains this. The non-milk revenue of the farm only represented 3.6% of gross revenue and was similar to the previous year.

Labour costs per farm accounted for the largest proportion of the increase in farm expenditure. They increased by \$1,106 to \$5,364 per farm. Contractors expenses also increased significantly. Most other costs increased by at least ten per cent. The proportion of total expenditure spent on labour increased from 21.8% to 23% while the proportion spent on operating costs declined from 46.8% to 46.1%.

With increasing herd size there was an increase in labour costs per cow up to the 200 cow herd size. This is partly because farms that have a high labour demand also have to provide housing and ancillary benefits.

Maximum net farm income per cow was attained in the 40 - 59 cow herd size while the maximum return per productive hectare was in the 80- 99 cow herd size. The level of net farm income per cow and per productive hectare was relatively constant beyond the 100 cow herd size.

The total value of farm assets increased significantly in the 1973/74 survey partly because all Government valuations were brought up to a 1974 base, using a series of Valuation Department indices. The total value of farm assets was \$167,952 in 1973/74 compared with \$95,552 in 1972/73. Analysis showed that as herd size increased, total capital investment in dairy stock and equipment per cow declined. With a greater number of large herds in the North Island the total value of assets per cow was considerably lower than in the South Island.

Using an imputed interest rate (instead of actual interest paid) of five per cent on the total farm assets, the national average net farm income was \$6,571.

There was relatively little change in the producers short and long term liabilities. Long term liabilities increased from \$28,804 to \$29,332 while short term liabilities increased from \$5,426 to \$5,594.

(ii) Productivity Aspects

The total number of town milk suppliers has been declining over the past few years, while total milk production has been increasing. There were 1794 suppliers in 1972/73, 1743 in 1973/74 and an estimated 1693 in 1974/75. In contrast, the average daily quota has increased from 655 to 749 litres in this three year period. The national herd size of the surveyed farms is 100 cows; this is similar to the 1972/73 survey but almost 100% greater than in 1960/61. There has been a gradual increase in stocking rates in this period. Considerably higher stocking rates were noted on North Island



farms compared with South Island farms. This is mainly due to climatic and soil conditions.

Milk production per cow on South Island farms was about 25 per cent greater than North Island, but production per hectare was 35 per cent lower than in the North Island. The South Island has a higher proportion of high yielding friesian cows.

Analysis showed that productivity per cow is not related to the productive area of farm. High producing cows were found on both small and large farms. There is a tendency for milk output per hectare to fall as the productive area of farm increases. It could well be that the larger farms could increase their productive capacity.

Milk production per cow on North Island farms declined with increasing herd size up to 150 cow herd and then increased significantly thereafter. This may be due to the fact that smaller herds receive more management and larger herds have better quality stock or milking techniques.

It was noted that of the total milk produced in the year, Canterbury suppliers produced a higher proportion of winter milk compared with suppliers from Wellington and Auckland regions. This is probably brought about by the payout system of the producer companies in Canterbury to promote winter milk production and to lower the peak in spring.

Over the past three or four years, the proportion of total milk produced that is used for town supply has remained around 22 per cent. It was noted that a higher proportion of total milk sold at surplus milk prices was produced on the farms holding lower quotas. Farms with over 800 litre quotas sell approximately 15 per cent of total milk at surplus prices, while those with lower quotas sell 25 to 35 per cent at surplus prices.

(iii) Labour Usage

The average number of labour units that were involved in farm work was 2.03 units. The 1972/73 survey showed that 2.05 labour units were used. There was a small

decline in the total number of labour units employed on South Island farms from the previous year.

An increasing proportion of non-family labour was used with increasing herd size. At least 70 per cent of the labour employed on farms with herd sizes over 200 cows is non-family labour, whereas only ten per cent of the labour is non-family on farms with smaller herds.

Non-family labour only accounts for 28 per cent of all farm labour used on the surveyed farms. This is principally due to the fact that the sample did not include many large farms because of the criteria for selection.

The average milk output per labour unit was 175,854 litres. This was a small decline in the milk output per labour unit for the 1972/73 survey and can probably be explained by seasonal conditions.

The maximum milk productivity per labour unit on North Island farms was achieved on farms with over three labour units. It is likely that many of the smaller farms have insufficient cows for the available labour.

A labour unit on North Island farms manages an average of 55 cows, compared with 36 in the South Island.

(iv) Management Practises

Developments in the design of milking equipment and shed layout have taken place rapidly over the past ten years. The number of cows handled per labour unit is often greatly affected by the type of milking shed and equipment on the farm. Compared with the previous survey results, there has been little change in the type of milking shed in use or the number of pairs of cupsets in use.

There has been a considerable improvement in the types of effluent disposal systems on the farms. While disposal of effluent into streams and water courses is still significant (16%), it is considerably less than in the previous year (31%). An important factor constraining the rapid improvement of modern effluent disposal systems on many

farms is the high capital cost required for their installation.

It appears from the surveyed farms that less fertiliser was applied per farm than in the previous year. Practically all farms applied phosphatic fertiliser in some form, and about one quarter of the farms applied some form of nitrogenous manure.

Cow nutrition remained much the same as in the previous survey, except that greater use was made of purchased dairy meals and grains in the North Island. The total number of hay bales used on North Island farms during the year was about five per cent greater than in the previous year while in the South Island the usage was down 13 per cent.

In this particular season, meal and grain feeding was profitable under North Island conditions. There was a considerable shortage of fodder crops and grass for grazing. Many of the farms who fed meal or grain only did so to alleviate drought conditions.

Approximately half of all farms used some form of herd testing. Monthly herd testing was the most predominant. There was a significant difference in milk production for the surveyed farms that used herd testing over those not using herd testing. It was noted that farms using herd testing were larger and held larger quotas. Herd testing fees account for less than one per cent of total farm expenditure.

No attempt has been made to draw any conclusions on the difference in profitability on North or South Island farms or whether an increase in town milk price is justifiable. The analysis has primarily been carried out to meet the basic objective of the survey, namely the determination of an average farm income for each Island and the country as a whole.

## ACKNOWLEDGEMENTS

The Agricultural Economics Research Unit gratefully acknowledges the co-operation and assistance willingly provided by officers of the New Zealand Milk Board and the Town Milk Producers' Federation. In particular, thanks are expressed to the town milk producers for co-operating in the survey and making the information contained in accounts so freely available.

## APPENDICES

Appendix A. Survey Definitions and Treatment of Data

The same basic survey principles and procedures have been adopted as in surveys of previous years. In order to standardise costing procedures and convert all accounts to an owner operated basis, a number of financial criteria used in former surveys by the New Zealand Milk Board and the Producers' Federation have been adopted.

The following definitions and principles were adopted in extracting and assembling data from each farm:-

(i) Farm Areas

The productive area of farms includes that land to which dairy stock have regular access. It is the area grazed by stock plus the area in roads, yards and buildings. Non productive land includes swamp, steep gullies, riverbeds and dense bush.

(ii) Run off Units

Run-off units are separate from the main farm and may be used to rear young dairy stock or to carry other stock from time to time. Run-offs were included in total farm area.

(iii) Labour

A labour unit was defined as a worker (18 years old or over), whether owner or employee, who worked on the farm full-time over the survey period. Fractional units of labour were used when including work carried out on part year or part time basis.

(iv) Value of a Unit of Labour

A standard wage of \$4,000 per annum with or without the provision of a house, has been assumed for all imputed wages.

(v) Unpaid Labour

Any unpaid labour (usually family) was assessed as follows:-

Men over 20 years of age	: \$1.50 per hour
16-20 yr old youths, women or aged people	: \$1.00 per hour

12-16 year old children : 50¢ per hour  
 Children under 12 years old : nil

(vi) A figure of \$130 for produce used per full time labour unit was adopted to cover milk, meat, vegetables and firewood used. This allowance was not extended to the owner of members of the farm family.

(vii) Full Board and Lodging

This was assessed at \$10 per week per person.

(viii) House Rent for Employees

Where a house was provided by the farmer for an employee, the rental was assumed to be a fair rental value for the district. The average approximated \$20 per week. This figure was both added to revenue and also taken as a cost following Milk Board procedures of previous years.

(ix) Land Values

The most recent Government valuation for each farm was obtained. It is recognised that these valuations, while expertly done, are usually below market values partly by reason of the five year interval between valuations.

In order to achieve consistency between farms it was decided to update all valuations to 1974 levels. The Valuation Department's "Farmland Sale Price Index" (base 1960 = 1000) was used to determine the required updating factor. All open market sales of freehold farmland recorded by the Department are used to calculate the index. Family sales are excluded as are sales of land that has a significant potential for utilisation for other than primary production.

A section of the Farmland Sale Price Index<sup>15</sup> is set out below.

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<sup>15</sup> Report of the Valuation Department for the year ended 31st March 1975.

Year ended 31st December	Index number
1960	1000
1971	1754
1972	1880
1973	2346
1974	3466

To bring all farm valuations up to a 1974 level using the above index, the latest Government valuations were multiplied by the appropriate factor.

No other agency compiles regular indices on sales of farmland. Officers of the Valuation Department considered the index to be accurate enough for a revaluation estimate. To obtain a value for land only, the total opening book value of all farm buildings was deducted from the updated capital value of the farm.

(x) Valuation of Farm Buildings

The opening book values of all farm buildings were used to determine depreciation. Most of the book values were well out of date and so did not reflect present market or replacement values.

The normal 2.5 per cent depreciation rate was applied to opening book values of all houses on the farm except that rates were applied to only one quarter of the opening book value of the dwelling of the owner operator.

(xi) Depreciation

Depreciation on all capital items was based on rates used for taxation purposes, except that special depreciation on buildings was excluded. All personal allowances for depreciation (e.g. motor car) were deducted from the gross depreciation to give a net farm depreciation.

(xii) Liabilities

The balance sheet used to extract the current and long term liabilities outstanding at the beginning and end of the financial year. Personal liabilities were ignored.

(xiii) Capital

The estimation of working capital was changed from the previous year's survey to allow for inflation and the increasing capital intensity on farms. Previously, working capital was estimated by taking one-sixth of the paid labour plus the sum of \$500. In the present survey the working capital was calculated by dividing the total cash expenses on each farm by 12. Hence, cash expenses for a month are considered equivalent to the annual working capital of the farm.

(xiv) Development Expenditure

All development expenditure that was incurred on the farm during the year was recorded. The total value was added to the net capital value of land, giving a total opening book value of land and improvements.

(xv) Total Milk Revenue

Total milk revenue includes proceeds from the supply of both quota and surplus milk. The total value of milk sold was extracted from each set of accounts.

(xvi) Total Farm Expenditure

Total farm expenditure included all purchases and payments for services for the farm during the financial year. Expenditure also included depreciation, unpaid labour and labour accomodation costs.

(xvii) Livestock Units

Total livestock units per farm was calculated using ewe equivalent data given in the Lincoln College

Technical Bulletin, 1975:		Units		Units
Dairy Stock - All cows		8.5	Other stock - sheep	0.9
heifers in calf		7.5	Beef cattle	
heifers		6.0	(non dairy)	4.5
yearlings		5.0	Pigs	4.0
bulls		5.0	Beef calves	3.0
calves		4.0		
young bulls		4.0		
reared replacements		2.0		



(vii) Valuation of Livestock by Standard Values

Many of the standard values for livestock adopted in the previous survey, were increased for use in the 1973/74 survey and are as follows:-

Cows	:	\$120 per head
Heifers in calf	:	\$100 per head
Heifers	:	\$ 80 per head
Yearlings	:	\$ 50 per head
Calves	:	\$ 20 per head
Bulls	:	\$200 per head
Young bulls	:	\$100 per head
All sheep	:	\$ 5 per head
All beef cattle	:	\$100 per head
Pigs	:	\$ 5 per head
Beef cattle	:	\$ 20 per head

Appendix B. Survey Results by Quota Size

## INTRODUCTION

The survey results by quota size are set out in the following series of tables (Tables 41 - 48). Results are expressed both per farm and per cow and refer to all farms in the survey.

Due to the sample size and the uneven distribution of farms within the seven quota groups the reader should be particularly careful when making comparisons between groups.

TABLE 41 Capital Structure per Farm by Quota Group

	Quota Group (litres)							
	All quota groups	Under 200	201-400	401-600	601-800	801-1000	1001-1200	Over 1200
(\$ per farm)	\$	\$	\$	\$	\$	\$	\$	\$
Land & buildings	136,701	56,791	93,218	106,966	159,033	148,270	166,688	234,595
Plant, vehicles & stock	28,864	14,177	17,481	22,651	32,898	33,878	32,587	55,607
Miscellaneous	2,387	1,111	1,234	1,741	2,496	2,961	3,171	5,499
<u>Total Assets</u>	167,952	72,079	111,933	131,358	194,427	185,109	202,446	295,701
<u>Current liabilities</u>	5,594	1,602	3,785	4,852	5,054	5,778	3,575	12,352
<u>Long term liabilities</u>	29,332	12,928	25,452	23,593	38,416	26,373	15,302	47,075

TABLE 42 Capital Structure per Cow by Quota Group

	Quota Group (litres)							
	All quota groups	Under 200	201-400	401-600	601-800	801-1000	1001-1200	Over 1200
(\$ per cow)	\$	\$	\$	\$	\$	\$	\$	\$
Land & buildings	1,367	1,578	1,504	1,354	1,420	1,312	1,142	1,197
Plant, vehicles & stock	289	394	282	287	294	300	223	284
Miscellaneous	24	31	20	22	22	26	22	28
<u>Total Assets</u>	1,680	2,003	1,806	1,663	1,736	1,638	1,387	1,509
<u>Current liabilities</u>	56	45	61	61	45	51	25	63
<u>Long term liabilities</u>	293	359	411	299	343	233	105	240

TABLE 43

Gross Farm Revenue per Farm

	Quota Group (litres)							
	All quota groups	Under 200	201-400	401-600	601-800	801-1000	1001-1200	Over 1200
(\$ per farm)	\$	\$	\$	\$	\$	\$	\$	\$
Total milk revenue	31,471	10,365	16,249	23,751	35,007	38,682	47,874	66,946
General income	1,274	285	528	907	1,182	2,291	2,260	2,622
Livestock profit	3,130	-786	1,309	2,060	3,276	4,261	4,639	8,350
Gross farm revenue	35,875	9,864	18,086	26,718	39,465	45,234	54,773	77,918

TABLE 44

Gross Revenue per Cow

	Quota Group (litres)							
	All quota groups	Under 200	201-400	401-600	601-800	801-1000	1001-1200	Over 1200
(\$ per cow)	\$	\$	\$	\$	\$	\$	\$	\$
Total milk revenue	314.71	287.92	262.08	300.65	312.56	342.32	327.90	341.56
General income	12.74	7.92	8.52	11.48	10.55	20.47	15.47	13.38
Livestock profit	31.30	-21.83	21.11	26.08	29.25	37.71	31.77	42.60
Gross farm revenue	358.75	274.00	291.71	338.21	352.36	400.50	375.14	397.54

TABLE 45 Expenditure per Farm

	Quota Groups (litres)							
	All quota groups \$	Under 200 \$	201-400 \$	401-600 \$	601-800 \$	801-1000 \$	1001-1200 \$	Over 1200 \$
Labour Costs	5,364	886	2,064	3,337	5,068	5,807	10,045	17,276
General operating costs	9,252	5,187	4,119	7,310	10,457	10,552	9,139	20,251
Irrigation costs	108	0	134	33	131	207	0	205
Vehicle costs	1,423	787	955	1,187	1,563	1,659	1,515	2,479
Sub-total operating costs	10,783	5,974	5,208	8,530	12,151	12,418	10,654	22,935
Administration costs	700	437	496	487	613	908	1,060	1,618
Overheads	4,304	878	2,525	2,870	5,250	5,092	7,743	9,465
Total cash expenditure	21,151	8,175	10,293	15,224	23,082	24,225	29,502	51,294
Depreciation	2,200	656	1,361	1,894	2,304	2,910	2,427	3,672
Total farm expenditure	23,351	8,831	11,654	17,118	25,386	27,135	31,929	54,966

TABLE 46. Expenditure per Cow

	Quota Groups (litres)							
	All quota groups	Under 200	201-400	401-600	601-800	801-1000	1001-1200	Over 1200
	\$	\$	\$	\$	\$	\$	\$	\$
Labour costs	53.64	24.61	33.29	42.24	45.25	51.39	68.80	88.14
General operating costs	92.52	144.08	66.43	92.53	93.37	93.38	62.60	103.32
Irrigation costs	1.08	0.00	2.16	0.42	1.17	1.83	0.00	1.05
Vehicle costs	14.23	21.86	15.40	15.03	13.96	14.68	10.38	12.65
Sub-total operating costs	107.83	165.94	83.99	107.98	94.54	109.89	72.98	117.02
Administration costs	7.00	12.14	8.00	6.16	5.47	8.04	7.26	8.26
Overhead costs	43.04	24.39	40.72	36.33	46.88	45.06	53.03	48.29
Total cash expenses	211.51	227.08	166.00	192.71	206.09	214.38	202.07	261.70
Depreciation	22.00	18.22	21.95	23.97	20.57	25.75	16.62	18.73
Total farm expenditure	233.51	245.30	187.95	216.68	226.66	240.13	218.69	280.43

TABLE 47

Net Income per Farm

	Quota Group (litres)							
	All quota groups	Under 200	201-400	401-600	601-800	801-1000	1001-1200	Over 1200
	\$	\$	\$	\$	\$	\$	\$	\$
Gross farm revenue	35,875	9,865	18,086	26,718	39,465	45,234	54,773	77,918
Total farm expenditure	23,351	8,831	11,654	17,118	25,386	27,135	31,929	54,966
Net farm income	12,524	1,034	6,432	9,600	14,079	18,099	22,844	22,952

TABLE 48

Net Income per Cow

	Quota Group (litres)							
	All quota groups	Under 200	201-400	401-600	601-800	801-1000	1001-1200	Over 1200
	\$	\$	\$	\$	\$	\$	\$	\$
Gross farm revenue	358.75	274.00	291.71	338.21	352.36	400.50	375.14	397.54
Total farm expenditure	233.51	245.30	187.97	216.68	226.66	240.13	218.69	280.43
Net farm income	125.24	28.70	103.74	121.53	125.70	160.37	156.45	117.11

Appendix C.

TABLE 49.

Analysis of Net Farm Income by Island and Quota Group in  
Cents per Litre of Milk Produced

<u>Gross Farm Revenue</u>	New Zealand	North Island	South Island
	C/L	C/L	C/L
Milk income	8,816	8,690	9,162
Other income	0.357	0.323	0.452
Livestock profit	0.877	0.877	0.876
Gross farm revenue	10.050	9.890	10.490
<u>Farm Expenditure</u>			
Labour costs	1.503	1.555	1.358
Operating costs	3.021	3.032	2.988
Administration costs	0.196	0.200	0.185
Overhead costs	1.206	1.222	1.163
Total cash expenses	5.926	6.009	5.694
Net depreciation	0.616	0.572	0.738
Total farm expenditure	6.542	6.581	6.432
<u>Net Farm Income</u>	3.508	3.309	4.058
<u>Total capital employed</u>	47.047	45.801	50.670

	By Quota Group (litres)						
	Under 200	201- 400	401- 600	601- 800	801- 1000	1001- 1200	Over 1200
	C/L	C/L	C/L	C/L	C/L	C/L	C/L
Milk income	9.410	8.644	9.198	7.922	8.885	9.585	8.751
Other income	0.260	0.281	0.351	0.267	0.271	0.452	0.343
Livestock profit	-0.713	0.696	0.798	0.741	0.752	0.929	1.091
Gross farm revenue	8.954	9.621	10.347	8.930	9.068	10.966	10.185
<u>Farm Expenditure</u>							
Labour costs	0.804	1.098	1.292	1.147	1.334	2.011	2.258
Operating costs	5.423	2.770	3.303	2.750	2.852	2.133	2.998
Administration costs	0.397	0.264	0.189	0.139	0.209	0.212	0.211
Overhead costs	0.796	1.344	1.111	1.188	1.170	1.550	1.237
Total cash expenses	7.420	5.476	5.896	5.224	5.565	5.906	6.704
Net depreciation	0.595	0.724	0.733	0.521	0.668	0.486	0.480
Total farm expenditure	8.015	6.200	6.629	5.745	6.233	6.392	7.184
<u>Net Farm Income</u>	0.939	3.421	3.718	3.185	2.835	4.574	3.001
<u>Total capital employed</u>	65.428	59.540	50.870	44.000	42.520	40.530	38.650

C/L = cents per litre.



## Appendix D.

TABLE 50

Age, Experience and Family Labour  
Characteristics

Survey Details	
Average age of farmer at time of survey (yrs)	44.6
Average number of years farmer has been a town milk producer (yrs)	15.4
Minimum period a farmer has been a T.M.Producer (yrs)	2.0
Maximum period a farmer has been a T.M.Producer (yrs)	48.0
Average number of children per family	3.0
Average number of children living at home	2.0
Average number of owner operator labour units per farm	0.94
Average number of permanent family labour units per farm	0.46
Average number of casual family labour units per farm	0.07
Per cent of farms with no non-family labour (except contractors)	22.2

Appendix E. Taxable Net Farm Income

Data from each set of farm accounts was extracted directly from farm accounts and collated without any adjustments. Data summarised in Table 51 shows that Net Farm Income to be approximately \$2,000 under the survey estimate. The main reasons for this were the adjustment of labour expenses and the different calculation of livestock profit.

TABLE 51

Taxable Net Farm Income as Reported in Farm Accounts

Item	New Zealand	North Island	South Island
Gross farm revenue (\$/farm)	32,795	35,215	27,648
Total farm expenditure (\$/farm)	22,321	24,457	17,758
Taxable net farm income (\$/farm)	10,474	10,758	9,890

Appendix F. Metric Conversion TablesConversion from Metric to British System

	<u>Multiply by</u>
Kilometres to miles	0.6214
Hectares to acres	2.4711
Litres to gallons	0.2200
Litres to pints	1.7600
Kilograms to pounds (av.)	2.2046
Kilograms to hundredweights (av.)	0.0197
Tonnes to tons (av.)	0.9842



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