

AN ECONOMIC SURVEY
OF NEW ZEALAND WHEATGROWERS

Survey No. 2

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THE AGRICULTURAL ECONOMICS RESEARCH UNIT

Lincoln College, Canterbury, N.Z.

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PREFACE

This Report is the second in an annual series of economic surveys of New Zealand wheatgrowing farms. These surveys have been undertaken by the Agricultural Economics Research Unit at Lincoln College on behalf of Wheat Growers Sub-Section of Federated Farmers of New Zealand Inc.

Specific attention has been focused on the physical characteristics of wheatgrowing farms, the area of wheat and other crops sown, wheat yields, cultural practices and costs and returns for the 1977/78 wheat crop. An attempt has also been made to allocate plant and machinery overhead costs to the wheat enterprise on both an historical and current cost basis.

The need for current and detailed information from the Survey involved two visits to the farms in the sample; one in the spring following drilling and the second in the autumn after harvest. This field work was carried out mainly by Roger Lough, Russell Moffitt and Robyn MacLean. Computer programming and analysis was aided by Susan Lines and the Report was compiled by Lance Davey.

J. B. Dent
Director

October 1978

CORRECTIONS TO 1976-77 REPORT

Since the 1976-77 Report was published two errors have been discovered which necessitate the following changes to Tables 18 and 24:

TABLE 18

Item 10:	North Island Revenue	521.42
	South Canterbury Revenue	372.51
	All Farms Average Revenue	406.72
Item 11:	North Island Gross Margin	344.28
	All Farms Average Gross Margin	279.42
Item 12:	North Island Gross Margin minus Machinery Overheads (A)	318.26
	All Farms Average Gross Margin minus Machinery Overheads (A)	241.30
Item 13:	North Island Gross Margin minus Machinery Overheads (B)	301.33
	All Farms Average Gross Margin minus Machinery Overheads (B)	220.76

TABLE 24

North Island Total Revenue	521.42
All Farms Average Total Revenue	406.72

CHAPTER 1

INTRODUCTION

The National Wheatgrowers' Survey is an annual survey being undertaken by the Agricultural Economics Research Unit at Lincoln College on behalf of Wheat Growing Sub-Section of Federated Farmers of New Zealand Inc. This Report summarises information collected from participating farmers for the 1977-78 wheatgrowing season.

1.1 Climatic Conditions

For the 1977-78 season, weather conditions in most areas were characterised by a wet winter which delayed planting and reduced early growth, followed by a dry summer which tended to reduce the yield of spring sown crops and also led to an earlier harvest than for the previous season.

Wright¹ provided the following details on weather conditions in the various regions: For the North Island sowing was completed late following cultivation delays, but with good rains in December and hot dry weather in January high yields were expected. For Nelson-Marlborough cool southerlies in the spring following a wet winter further delayed sowing and slowed growth until late in the spring. Good rains led to vigorous growth in November and December, but the rest of the summer was hot and dry. Wet conditions in North and Central Canterbury in August and September also led to late planting and reduced early growth. However, by the end of October

¹ Wright, G.M. (1978), Crop Research Division, DSIR, pers. comm.

soils had become very dry, and in some districts there was little further rain throughout the summer. Most areas did receive useful rain in December though. Drought developed very early in Central Otago and lasted throughout the summer. In South Otago crops germinated slowly, after late sowing, but the summer weather was favourable for growth, and for harvesting. In Southland, August weather was sufficiently mild for wheat to be sown but low spring temperatures and some wet periods caused sowing delays, slow establishment, weed growth and nitrogen leaching. From mid-January conditions were hot and dry, and harvesting started about three weeks earlier than usual.

One method of gaining an overall picture of the climatic conditions as they relate to wheat growing is to weight the information from various meteorological stations throughout the country by the amount of wheat grown in the vicinity of those stations. The New Zealand Meteorological Service produces such figures for rainfall, temperature, sunlight and days of moisture deficit (Table 1). An examination of these figures supports the view that winter rainfall was higher than normal (and sunshine lower) and that summer rainfall was lower than normal (and sunshine higher). Temperatures do not appear to have been consistently higher or lower than normal until January (onwards) when average temperatures were one to two degrees Centigrade above average.

TABLE 1

Climatological Indices for New Zealand Wheat Growing Areas^a
1977-78

Month	Rainfall	Average Temperature	Soil Moisture Deficit ^b	Sunshine
	Percent of normal ^c	Deviation from normal ^c (°C)	Days for Month	Percent of normal ^c
March	28	+0.3	22.4	116
April	96	+0.4	13.3	102
May	96	-1.2	-	94
June	146	-0.1	-	83
July	131	+0.5	-	70
August	75	+0.1	-	96
September	177	-1.9	-	83
October	71	+0.1	0.7	111
November	67	-0.4	3.0	110
December	99	-0.2	13.0	107
January	58	+1.2	13.7	110
February	43	+1.1	21.3	124
March	57	+1.4	17.7	123
April	217	+1.6	5.2	79

^aWeighted by county wheat areas in 1967/68.

^bWeighted number of days for the month with a soil moisture deficit of more than 75mm.

^c1941-70

Source: Maunder, W.J., N.Z. Meteorological Service, pers. comm., 1978.

1.2 Wheat Price

The New Zealand Wheat Board is responsible for the purchase from growers of all wheat of milling standard quality, except those lines qualifying for acceptance as certified seed wheat under the scheme operated by the Ministry of Agriculture and Fisheries. Lines of wheat that do not meet milling standard are disposed of by the growers themselves, generally for stock feed.

The price to be paid for wheat of milling standard is fixed by the Government and announced prior to sowing. The price for milling quality wheat becomes the maximum price that may be paid for wheat of lower quality. The Government also sets the prices for the products of milling.

For the 1978 harvest the announced basic price was \$120 per tonne with a 20 per cent premium for the variety Hilgendorf and discounts of 10 per cent and 5 per cent respectively for Arawa and Karamu. The actual price paid to growers was reduced by a \$2.00 per tonne retention and a further \$0.46 per tonne for various levies.

Table 2 sets out the basic wheat price paid in recent years.

TABLE 2

Basic Wheat Price

Harvest Year	Price (\$/tonne f.o.r.)
1966	53.28
1967	53.28
1968	53.28
1969	53.28
1970	53.28
1971	53.28
1972	55.12
1973	56.95
1974	59.71
1975	91.66
1976	102.88
1977	110.00
1978	120.00
1979 ^a	127.50

^a In early 1978, the Government announced a 1979 basic price of \$127.50 per tonne with a premium of 20 per cent (up from 10 per cent) for Hilgendorf and discounts of 5 per cent for Arawa and 10 per cent for Karamu. The discount for Arawa was reduced from 10 per cent in 1978 while that for Karamu was increased from 5 per cent.

In recent years growers who store wheat have been paid a storage increment. For the 1978 harvest the storage increment commenced at \$2.03 per tonne for wheat sold during the first two weeks of April and will reach a maximum of \$12.15 per tonne for wheat held until the end of November (Table 3).

TABLE 3

Growers' Storage Increments
1978

Date Sold	Storage Increment (\$ per tonne)
April, 1-15	2.03
16-30	2.70
May, 1-15	3.38
16-31	4.05
June, 1-15	4.73
16-30	5.40
July, 1-15	6.08
16-31	6.75
August, 1-15	7.43
16-31	8.10
September, 1-15	8.78
16-30	9.45
October, 1-15	10.13
16-31	10.80
November, 1-15	11.48
16-30	12.15

1.3 Survey Description

The sampling unit for the survey is a wheatgrowing farm. For the purposes of this survey a wheatgrowing farm is defined as any farm which has delivered wheat to the Wheat Board over the most recent five year period for which records are available. Since the Wheat Board had not finished purchasing wheat from the 1977 harvest at the time the sample was finalised, the most recent five year period for which records were available was 1972 to 1976. Approximately 75 per cent of those who participated in the 1976-77 survey (Survey No. 1) were retained for the 1977-78 survey.

Information relating to the farm, its management, crop and livestock enterprises, and wheatgrowing costs and returns was obtained from farmers by personal interview conducted on two farm visits over the 1977-78 season. Since one of the objectives of the survey is to collect information on crop areas and livestock numbers from year to year farms not actually growing wheat in 1977-78 were retained in the sample.

Stratification. To ensure that various regions within the industry were adequately represented, the sample was stratified by region. Four regions were specified for the purposes of the survey and the growers' names were allocated to these regions based on the rail station from which wheat was despatched. The regions were defined as follows:

1. North Island.
2. Canterbury (South Island growers north of the Rangitata River).
3. South Canterbury (South Island growers north of Palmerston and south of the Rangitata River).
4. Southland (South Island growers south of Palmerston).

Survey farm distribution. Table 4 gives the distribution of farms in the sample by region and also the distribution of the population by region. Since wheat may have been sold under more than one name from the same farm over the 1972 to 1976 base period (due to farm sales or internal transfers) the number of names on the Wheat Board records is likely to be higher than the number of wheatgrowing farms. In order to determine the proportion of the total number of wheatgrowing farms which occur in each region it was assumed that the ratio of farms to names is the same for each region. Hence the proportion of the population (farms) in each region is the same as the proportion of names on the Wheat Board records in each region.

TABLE 4

Distribution of Survey Farms
and Survey Population by Region

Region	Number of Farms Surveyed	Proportion of Sample in Region	Proportion of Population in Region
North Island	11	0.06	0.06
Canterbury	74	0.42	0.42
South Canterbury	42	0.24	0.22
Southland	51	0.29	0.30
	<hr style="width: 100%; border: 0.5px solid black;"/> 178	<hr style="width: 100%; border: 0.5px solid black;"/> 1.00	<hr style="width: 100%; border: 0.5px solid black;"/> 1.00

Weighting and the "All Farms Average". The proportion of the population in each region (Table 4) is used to "weight" survey results for each region to give an "All Farms Average". This procedure ensures that each region assumes its correct degree of importance in the overall wheatgrowing industry.

CHAPTER 2

FARM CHARACTERISTICS

This chapter outlines some general farm characteristics for the survey farms in each region and for the New Zealand "average" wheatgrowing farm. The figures presented are averages for all survey farms and hence include some farms which did not grow wheat in the 1977-78 season (Table 5). Some caution should be exercised in relation to the North Island results because of the small number (11) of farms which were surveyed.

TABLE 5

Survey Farms Which Grew Wheat
1977-78

	Number of Survey Farms				
	North Island	Canterbury	South Canterbury	Southland	All Farms
Farms which grew wheat	11	64	30	41	146
Farms which did not grow wheat	0	10	12	10	32
Total	11	74	42	51	178

2.1 Property Values

Tables 6 and 7 present the average value of survey farms for the different regions on total value and value per total hectare basis respectively. These values were determined from the most recent government valuation (within the past five years), updated by the use of the Valuation Department's "Farmland Sales Price Index".

TABLE 6
Government Valuation of Survey Farms^a

Number of Survey Farms	North Island (11)	Canterbury (74)	South Canterbury (42)	Southland (51)	All Farms Average (178)
Land Value (\$)	266500	232305	174704	130402	191114
Value of Improvements (\$)	95033	65302	64248	70155	68310
Capital Value(\$)	361533	297607	238952	200557	259424

^a Most recent Government Valuation updated by the Valuation Department's "Farmland Sales Price Index".

TABLE 7

Government Valuation per Total Farm Area
of Survey Farms^a

	North Island	Canterbury	South Canterbury	Southland	All Farms Average
Number of Survey Farms	(11)	(74)	(42)	(51)	(178)
Land Value (\$/ha)	1031	1478	845	747	1092
Value of Improve- ments (\$/ha)	345	465	318	419	412
Capital Value(\$/ha)	1376	1943	1163	1166	1504

^a Simple average value per total farm hectare of the most recent Government Valuation updated by the Valuation Department's "Farmland Sales Price Index". A weighted average may be obtained by dividing the total values (Table 6) by the total farm areas (Table 8).

2.2 Farm and Crop Areas and Crop Yields

Table 8 outlines the "average" farm for each region according to farm size and crop areas harvested for the 1978 harvest. Compared to the 1976-77 survey the "All Farms Average" wheat area was down 5.8 per cent and the total cash crop area was down 3.3 per cent. As for the previous survey, wheat (21.2 hectares) and barley (9.8 hectares) were the major crops. For the individual regions average wheat areas harvested were slightly higher in North Island and Canterbury and lower in South Canterbury and Southland.

TABLE 8

Farm and Crop Areas, 1977-78

	North Island (11)	Canterbury (74)	South Canterbury (42)	Southland (51)	All Farm Average (178)
<u>Number of Survey Farms</u>					
<u>Farm Area</u>					
Total Farm Area (ha)	368.1	205.2	226.4	222.9	225.0
Effective Farm Area (ha)	356.3	195.8	220.9	218.5	217.8
Potential Cropping Area (ha)	197.5	188.8	191.1	192.1	190.8
Potential Cropping Area as a Prop'n of Total Farm Area (%)	54	92	84	86	85
<u>Cash Crop : Area Harvested</u>					
Wheat Area (ha)	22.6	27.9	19.2	13.0	21.2
Barley Area (ha)	6.9	14.3	10.8	3.5	9.8
Seed Peas Area (ha)	5.1	8.3	7.0	0.5	5.5
Vining Peas Area (ha)	0.0	0.8	0.8	0.0	0.5
Oats Area (ha)	0.4	1.7	1.4	1.8	1.6
Linseed Area (ha)	0.0	4.3	2.9	0.0	2.4
Oilseed Area (ha)	0.0	0.6	0.9	0.0	0.5
Potatoes Area (ha)	0.0	0.1	1.0	0.1	0.3
Maize Area (ha)	2.4	0.0	0.0	0.0	0.1
Grass Seed Area (ha)	0.7	6.4	3.0	0.8	3.6
Clover Seed Area (ha)	0.0	7.4	2.7	0.3	3.8
Other Cash Crop Area (ha)	0.6	0.6	1.2	0.1	0.6
Total Cash Crop Area Harvested (ha)	38.6	72.4	50.9	20.1	50.0
Wheat Area as a Proportion of Total Cash Crop Area (%)	59	39	38	62	45

The average total wheat production per survey farm for the 1978 harvest is shown in Table 9. Since all survey farms are included, the calculated averages are a function of:

1. The number of farms growing wheat, and
2. The average total yield on those farms.

Total wheat area, total wheat production and yield per hectare for only those farms which grew wheat (1977-78) are detailed in Chapter 3.

TABLE 9

Total Wheat Production and Yield, 1977-78

	North Island (11)	Canter- bury (74)	South Canter- bury (42)	Southland (51)	All Farms Average (178)
Number of Survey Farms					
Wheat Area drilled (ha)	22.6	28.0	19.5	13.1	21.3
Wheat Prod'n (tonnes)	117.71	92.68	69.05	60.37	79.29
Wheat Yield (tonnes/ha)	5.21	3.31	3.54	4.61	3.72

The average yields of crops other than wheat grown on the survey farms are presented in Table 10.

TABLE 10
Other Crop Yields by Region, 1977-78

Crop	No. of Farms which Grew Crop	No. of Farms which Recorded Yield	Area Har-vested	Ave. Yield (t/ha) ^a	No. of Farms which Grew Crop	No. of Farms which Recorded Yield	Area Har-vested	Ave. Yield (t/ha)
	North Island				Canterbury			
Barley	6	6	6.94	3.10	59	58	14.26	3.95
Peas(seed)	4	4	5.08	2.74	33	33	8.30	2.92
Peas(vining)					3	3	0.81	3.10
Oats	1	1	0.41	4.89	11	11	1.73	2.40
Linseed					19	19	4.27	2.01
Oilseed Rape					5	5	0.64	1.47
Potatoes					2	2	0.12	22.53
Maize	1	1	2.39	8.65				
Grass Seed(md)	2	2	0.67	0.87	28	26	6.39	0.56
Clover " (md)					27	26	7.40	0.51
	South Canterbury				Southland			
Barley	26	23	10.76	3.91	21	21	3.53	3.92
Peas(seed)	15	15	6.99	2.88	2	2	0.47	3.10
Peas(vining)	3	2	0.79	0.74				
Oats	10	5	1.44	2.19	16	15	1.79	3.47
Linseed	10	9	2.86	1.60				
Oilseed Rape	4	4	0.90	1.60				
Potatoes	3	2	1.02	27.69	2	2	0.05	6.73
Maize								
Grass Seed(md)	11	8	3.03	0.65	4	3	0.80	0.59
Clover " (md)	5	2	2.70	0.13	1	1	0.25	0.12
	All Farms Average							
Barley	37	36	9.83	3.93				
Peas(seed)	17	17	5.33	2.98				
Peas(vining)	2	2	0.51	2.74				
Oats	7	6	1.07	3.85				
Linseed	10	10	2.42	1.94				
Oilseed Rape	3	3	0.47	1.50				
Potatoes	2	1	0.28	26.35				
Maize	1	1	0.14	8.65				
Grass Seed(md)	14	13	3.39	0.61				
Clover " (md)	12	11	3.70	0.50				

^a Average for all survey farms.

2.3 Livestock Numbers

Average livestock numbers and total stock units per farm are presented as at June 30, and at December 31 (Table 11). Compared to the 1976-77 survey where average ewe numbers dropped slightly over this period there was an increase on the "All Farms Average" farm from 1440 to 1571. Total stock units are not directly comparable for the two surveys because the second date at which stock numbers were recorded was changed from November 30 to December 31. This led to lambs being reclassified as hoggets and hence being allocated a rating of 0.6 stock units per head. Average cattle numbers were down from 70 head per farm at 30 November, 1976, to 56 head per farm at 31 December, 1977.

TABLE 11
Livestock Numbers 1977-78

Number of Survey Farms	North Island (11)	Canterbury (74)	South Canterbury (42)	Southland (51)	All Farms Average (178)
<u>Farm Area</u>					
Total Farm Area(ha)	368.1	205.2	226.4	229.9	225.0
<u>Livestock Numbers at 30/6/77</u>					
Ewes	1832	1158	1458	1743	1440
Other Sheep	856	375	377	544	455
Cattle	255	41	34	55	57
Total Stock Units ^a	3459	1545	1820	2297	1946
Stock Units per Available Spring Grazing Area (S. U. /ha)	13.08	10.93	10.66	13.70	11.83
<u>Livestock Numbers at 31/12/77</u>					
Ewes	1908	1246	1498	2010	1571
Other Sheep	1388	908	1098	1734	1226
Cattle	260	33	30	66	56
Total Stock Units ^a	3864	1941	2290	3337	2552
Stock Units per Available Summer Grazing Area (S. U. /ha)	15.20	14.70	15.42	20.41	16.60

^a Stock Unit Conversions (per head)

<u>Sheep:</u>	Ewes	1.0 S. U.	<u>Cattle:</u>	Cows	6.0 S. U.
	Hoggets	0.6 S. U.		Calves	3.0 S. U.
	Others	0.8 S. U.		Bulls	5.0 S. U.
				Others	4.0 S. U.

The area of fodder and greenfeed crops sown on the survey farms since February 1977 is shown in Table 12. The total area is down slightly compared to the 1976-77 survey figure.

TABLE 12

Fodder and Greenfeed Crops Drilled Mar-Nov 1977

Number of Survey Farms	North Island (11)	Canterbury (74)	South Canterbury (43)	Southland (51)	All Farms Average (179)
<u>Fodder & Greenfeed Crops</u>					
Autumn Sown Area(ha)	8.3	15.0	12.6	5.2	11.1
Spring Sown Area(ha)	6.1	3.3	5.5	4.7	4.4
Total (ha)	14.4	18.3	18.1	9.9	15.5

CHAPTER 3

WHEAT AREA AND YIELD

This chapter deals with wheat area and yield for those survey farms which grew wheat in the 1977-78 season. A total of 146 of the 178 farms is included.

3.1 Wheat Area and Production per Farm

Table 13. presents average wheat area, total production and yield per hectare for those survey farms which grew wheat in the 1977-78 season.

TABLE 13

	North Island	Canterbury	South Canterbury	Southland	All Farms Average
Number of Survey Farms	(11)	(64)	(30)	(41)	(146)
Wheat Area (ha) ^a	22.6	32.3	27.0	16.3	25.8
Total Wheat Production (tonnes)	117.71	107.16	96.66	75.09	95.86
Yield per Hectare (tonnes) ^b	5.32	3.10	3.48	4.46	3.72
Weighted Yield per Hectare ^c (tonnes)	5.21	3.32	3.58	4.61	3.72

^aWheat area drilled per Farm which grew wheat.

^bSimple average of the individual farm yields per hectare.

^cWeighted average: Individual farm yields weighted by area drilled.

The average survey farm which grew wheat (All Farms Average) in 1977-78 grew 25.8 hectares of wheat and produced 95.86 tonnes at an average farm yield of 3.72 tonnes per hectare. The weighted average (weighted by area drilled) was also 3.72 tonnes per hectare which is 4.9 per cent less than the 3.91 tonnes per hectare recorded for the 1976-77 survey. This yield reduction combined with a 5.8 per cent reduction in wheat area for the average survey farm (Chapter 2) resulted in an overall reduction in wheat production for the 178 survey farms of approximately 10 per cent.

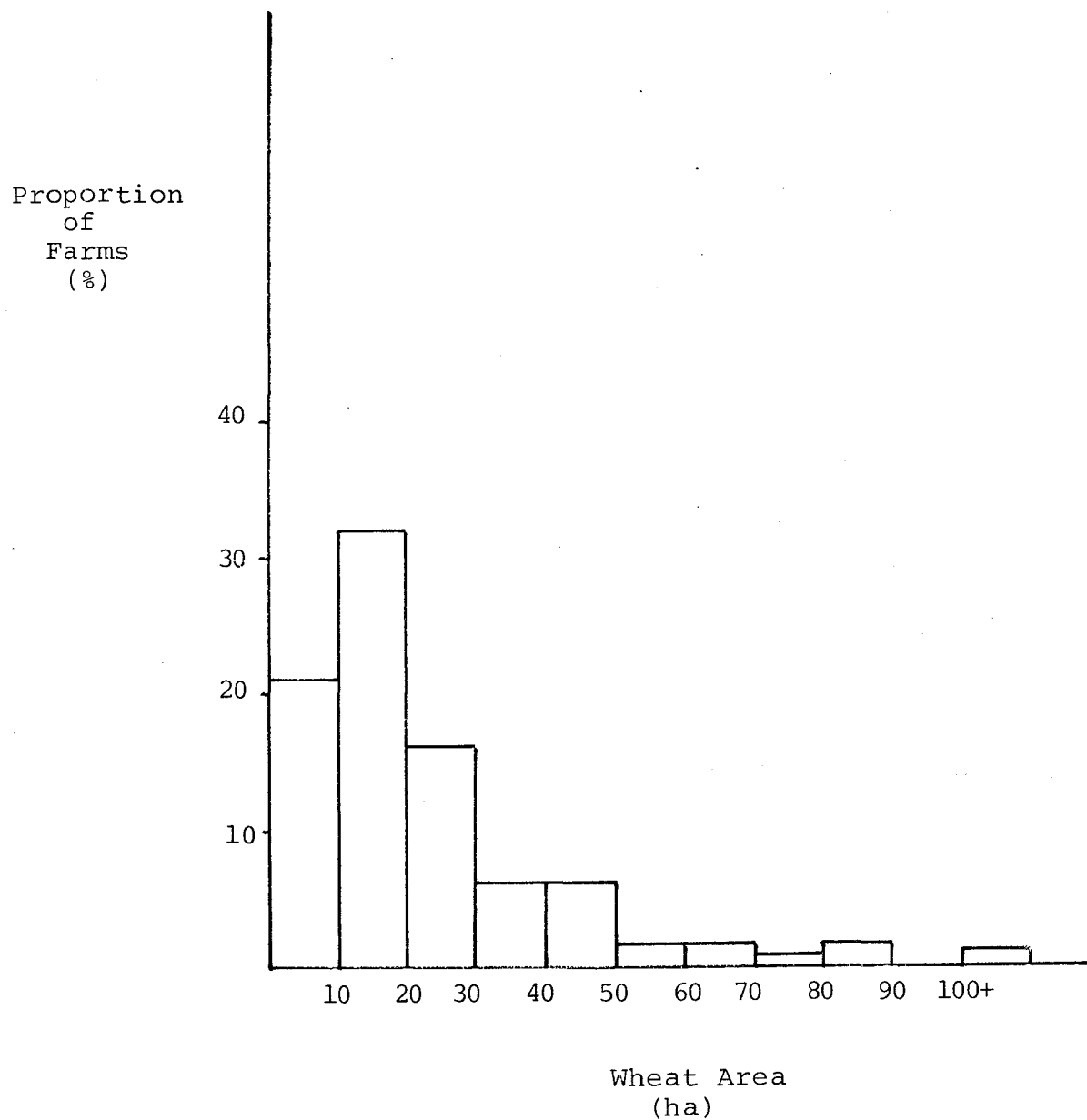
The distribution of survey farms which grew wheat by wheat area drilled is shown in Table 14 and Figure 1. Over all regions 73 per cent of farms drilled less than 30 hectares of wheat.

TABLE 14
 Distribution of Survey Farms which Grew Wheat
 by Wheat Area Drilled

Wheat Area Drilled (ha)	Proportion of Farms (%)				All Farms Average
	North Island (11)	Canterbury (64)	South Canterbury (31)	Southland (41)	
0- 9.99	36.36	20.31	16.67	26.83	22.43
10-19.99	27.27	21.88	36.67	51.22	34.26
20-29.99	27.27	14.06	20.00	14.63	16.33
30-39.99	0.00	12.50	3.33	2.44	6.72
40-49.99	0.00	12.50	6.67	2.44	7.45
50-59.99	0.00	6.25	3.33	0.00	3.36
60-69.99	0.00	4.69	3.33	0.00	2.70
70-79.99	0.00	0.00	3.33	2.44	1.47
80-89.99	0.00	4.69	6.67	0.00	3.44
90-99.99	0.00	0.00	0.00	0.00	0.00
100 and above	9.09	3.13	0.00	0.00	1.86
Total	100.00	100.00	100.00	100.00	100.00

FIGURE 1

Distribution of Survey Farms Which
Grew Wheat by Wheat Area
(All Regions)



Because some of the wheat is not of sufficiently high quality and because some wheat is retained for seed, the Wheat Board does not purchase the total wheat production in any year. Table 15 gives an estimate of the amount of wheat sold per farm to the Wheat Board from the 1978 harvest. Since much of the wheat had not been sold at the time of the second survey interview (immediately post harvest), the average amount sold to the Wheat Board was determined from that which had already been sold plus any which was expected to be sold, taking into account quality and own seed requirements.

TABLE 15

Estimated Wheat Production Sold to the
Wheat Board per Farm, 1978 Harvest

Number of Survey Farms which Grew Wheat	North Island (11)	Canterbury (64)	South Canterbury (30)	Southland (41)	All Farms Average (146)
Total Production (Tonnes)	117.71	107.16	96.66	75.09	95.86
Estimated Wheat sold to the Wheat Board (Tonnes) ^a	2.08	101.15	81.76	66.92	80.67
Wheat Sold to Wheat Board as a Prop- ortion of Total Production (%)	1.8	94.4	84.5	89.2	84.1

^a Wheat sold to the Wheat Board is an estimate determined from the amount which had been sold at the time of the second survey visit (post harvest) plus any which was expected to be sold, taking into account quality and own seed requirements.

On average 80.67 tonnes out of an average total production of 95.86 tonnes (84 per cent) was estimated as being sold to the Wheat Board from the 1978 harvest. This compares with 80 per cent for the 1976-77 survey; the slight improvement possibly being an indication of the better wheat quality reported for the 1978 harvest. As for the 1977 harvest only a very small proportion of the total wheat production from the North Island survey farms was expected to be sold to the Wheat Board.

Of wheat not sold to the Wheat Board the most important usage was as stock feed followed by sale or own use as seed (Table 26).

Table 16 compares wheat areas for the 1976/77 and 1977/78 surveys and lists wheat area intentions for the 1978/79 crop year. The wheat area intentions is the area that 1977/78 survey farmers stated they were intending to plant when visited at the completion of harvesting in 1978. As such it could be influenced by factors occurring between that time and the autumn or spring sowing date in 1978.

TABLE 16
Wheat Areas Drilled and Wheat Area Intentions

	Wheat Area (ha)		
	1976/77 Survey	1977/78 Survey	1978/79 Intentions ^a
North Island	20.0	22.6	22.5
Canterbury	27.4	28.0	26.8
South Canterbury	24.0	19.5	21.2
Southland	15.1	13.1	13.3
All Farms Average	22.5	21.3	21.3

^a Intentions for the 1978/79 season - recorded after harvest on the 1977/78 survey farms.

3.2 Wheat Variety Areas and Yields

Overall (All Farm Average), Kopara was the most important variety making up approximately 38 per cent of the total wheat drilled (Figure 2 and Table 17). This was followed by Karamu (23 per cent), Hilgendorf (8 per cent), Gamenya (2 per cent), Arawa (1 per cent) and other varieties (1 per cent). The most significant change from the previous survey is the increase in the area drilled with Takahe from less than 1 per cent (under "other varieties") to 12 per cent. The additional premium for Hilgendorf and the discount on Karamu do not appear to have greatly influenced the areas drilled of these varieties. For the survey farms Hilgendorf increased from 7 to 8 per cent of total area and Karamu decreased from 24 to 23 per cent.

FIGURE 2

Relative Importance of Different Varieties

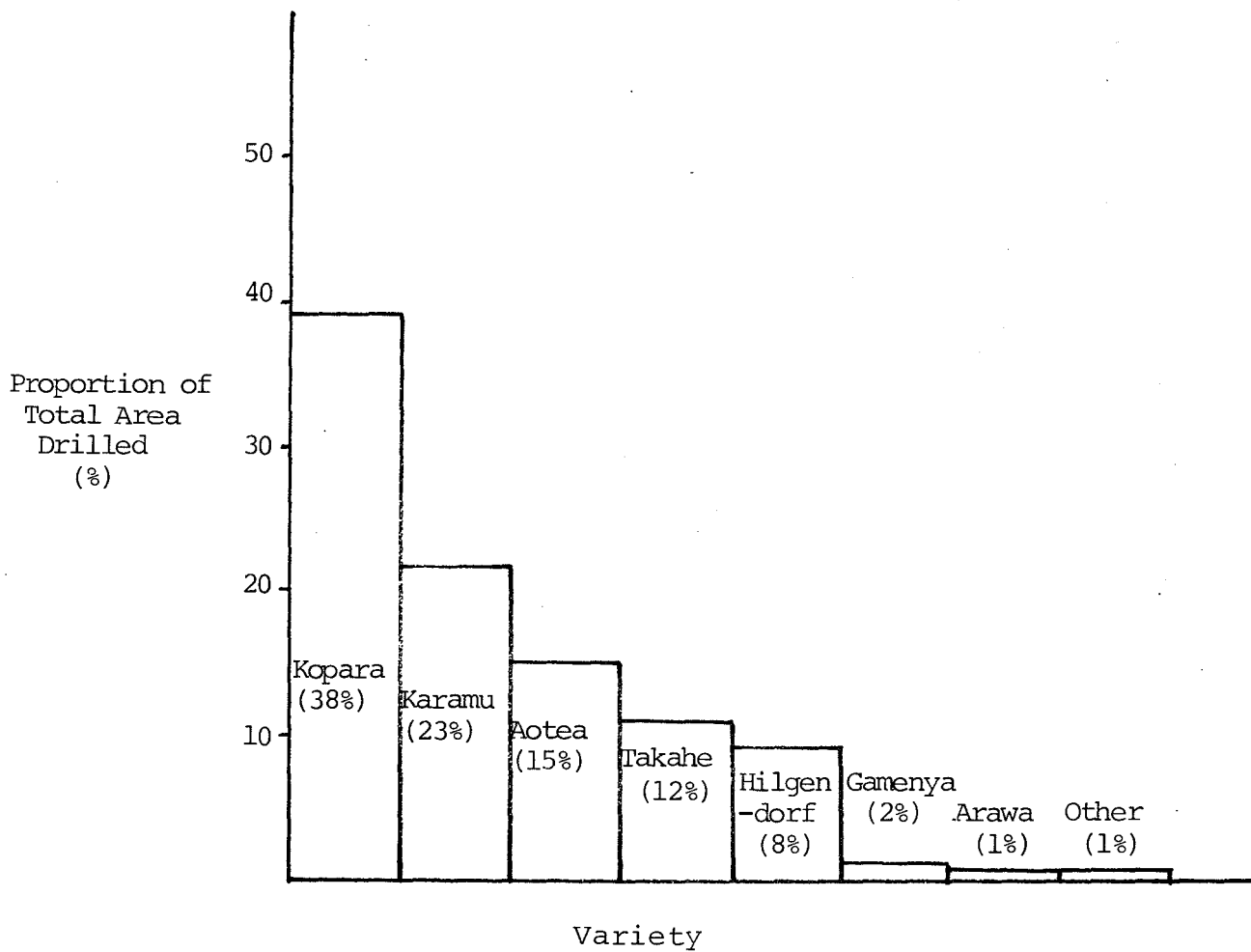


TABLE 17
 Wheat Varieties as a Percentage of
 Total Wheat Area Sown, 1977-78

Number of Survey Farms which Grew Wheat	North Island (11)	Canterbury (64)	South Canterbury (31)	Southland (41)	All Farms Average (147)
Wheat Variety	%	%	%	%	%
Kopara	0.0	56.7	42.1	17.1	38.2
Karamu	98.4	21.4	35.9	0.0	22.8
Aotea	0.0	5.2	5.0	38.0	14.7
Takahe	0.0	0.0	4.2	38.4	12.4
Hilgendorf	0.0	15.0	4.7	3.3	8.3
Gamenya	1.6	1.8	2.4	0.0	1.4
Arawa	0.0	0.6	0.9	3.2	1.4
Other	0.0	0.0	5.1	0.0	1.1
Total	100.0	100.0	100.0	100.0	100.0

Table 18 presents wheat area and production per survey farm and average yield per hectare for the different varieties recorded on the survey.

TABLE 18

Wheat Area, Production and Yield by Region and Variety
1977-78

Variety	No. of Farms which Grew Variety	Area Drilled (ha)	Total Production (t)	Average Yield (t/ha)	No. of Farms which Grew Variety	Area Drilled (ha)	Total Production (t)	Average Yield (t/ha)
	North Island				Canterbury			
Kopara	-	-	-	-	43	18.20	64.93	3.57
Karamu	11	22.24	116.63	5.24	25	6.87	20.82	3.03
Aotea	-	-	-	-	9	1.68	4.94	2.95
Takahe	-	-	-	-	-	-	-	-
Hilgendorf	-	-	-	-	16	4.80	14.47	3.01
Gamenya	1	0.37	1.08	2.90	4	0.57	1.53	2.69
Arawa	-	-	-	-	1	0.19	0.47	2.46
Other	-	-	-	-	-	-	-	-
Total		22.61	117.71	5.21		32.32	107.16	3.32
	South Canterbury				Southland			
Kopara	18	11.40	38.70	3.40	10	2.79	13.05	4.68
Karamu	14	9.72	39.78	4.09	-	-	-	-
Aotea	3	1.36	4.10	3.02	23	6.21	28.12	4.53
Takahe	3	1.13	3.86	3.42	19	6.27	30.24	4.83
Hilgendorf	4	1.18	2.79	2.37	2	0.54	1.62	2.99
Gamenya	2	0.64	1.60	2.51	-	-	-	-
Arawa	1	0.24	1.00	4.11	2	0.52	2.05	3.92
Other	3	1.39	4.83	3.49	-	-	-	-
Total		27.04	96.66	3.57		16.33	75.09	4.60
	All Farms Average							
Kopara	71	10.99	39.70	3.61				
Karamu	50	6.36	24.49	3.85				
Aotea	35	2.86	11.41	3.98				
Takahe	22	2.13	9.92	4.66				
Hilgendorf	22	2.44	7.18	2.94				
Gamenya	7	0.40	1.06	2.64				
Arawa	4	0.29	1.03	3.55				
Other	3	0.31	1.06	3.49				
Total		25.78	95.86	3.72				

CHAPTER 4

MANAGEMENT AND CULTURAL PRACTICES

Some of the management and cultural practices employed on the survey farms which grew wheat in 1977-78 are summarised in this chapter.

Average sowing and harvesting dates varied considerably between regions (Table 19). For the North Island and Southland farms wheat is almost exclusively a spring sown crop, whereas the majority of Canterbury and South Canterbury crops are autumn sown. Compared with the 1976-77 survey figures sowing dates were on average 19 days later and harvesting dates 14 days earlier.

Average sowing rates for the four survey regions are shown in Table 20.

TABLE 19
Average Sowing and Harvesting Dates^a

	North Island	Canterbury	South Canterbury	Southland
Number of Survey Farms which Grew Wheat	(11)	(64)	(31)	(41)
Sowing Date, 1977				
Average	Oct 5	July 10	Aug 2	Oct 1
Std. Dev. ^b (days)	18	44	45	32
Harvesting Date, 1978				
Average	Feb 21	Feb 6	Feb 10	Mar 12
Std. Dev. ^b (days)	9	10	13	14

^a The recorded average dates are simple averages of the average dates recorded for individual survey farms.

^b Std. Dev. is the standard deviation which gives an idea of the range of values involved in calculating the average. For a normal distribution 65 per cent of the individual figures lie within plus or minus one standard deviation of the mean, and 96 per cent lie within plus or minus two standard deviations.

TABLE 20
Average Sowing Rates

	North Island	Canterbury	South Canterbury	Southland	All Farms Average
Number of Survey Farms which Grew Wheat	(11)	(64)	(31)	(41)	(147)
<u>Sowing Rate (kg/ha)</u>					
Average	185	132	146	179	152

Tractor running costs involved in cultivation and drilling and the associated labour costs form a substantial proportion of total establishment costs (Table 29). Average tractor hours for cultivation and drilling are presented in Table 21.

TABLE 21

Tractor Hours for Wheat Cultivation and Drilling^a
1977-78

	North Island	Canterbury	South Canterbury	Southland	All Farms Average
Number of Survey Farms Which Grew Wheat	(11)	(64)	(31)	(41)	(147)
<u>Tractor Cultivation Time</u> (hrs/ha)	(10)	(62)	(31)	(39)	(142)
Average	4.23	3.57	3.93	4.07	3.84
Std. Dev. ^b	1.61	1.42	1.74	1.46	1.51
<u>Tractor Drilling Time</u> (hrs/ha)	(9)	(63)	(31)	(39)	(142)
Average	1.02	0.85	0.91	1.09	0.95
Std. Dev. ^b	0.29	0.65	0.39	0.35	0.51

^aFarms which used contractors are excluded.

^bStd. Dev. is the standard deviation which gives an idea of the range of values involved in calculating the average. For a normal distribution 68 percent of the individual figures lie within plus or minus one standard deviation of the mean, and 96 percent lie within plus or minus two standard deviations.

For the average survey farm (All Farms Average), the time spent in cultivation (3.84 hours per hectare) was less than for the previous year (4.10 hours per hectare). Drilling times were consistent for both years.

Table 22 lists a number of cultural and management practices which were involved in growing and harvesting the wheat crop and the proportion of the survey farms which grew wheat in 1977-78 which undertook these practices. A given practice is regarded as having been undertaken on a farm even if it only applied to part of the total wheat crop. For example, only part of the wheat crop may have been undersown with clover or only part of the wheat may have had nitrogenous fertiliser topdressed.

The major differences in cultural and management practices between this survey and the previous one (1976-77) are in irrigation and grain drying. In 1976-77, 13 survey farms (7 per cent) in Canterbury, irrigated wheat. In 1977-78 the drier season led to 25 farms (16 per cent) irrigating wheat. The drier summer also resulted in a large reduction in the proportion of farms which had to artificially dry wheat. For the 1977 harvest 44 per cent of growers dried wheat whereas for the 1978 harvest this was reduced to 2 per cent.

TABLE 22

Various Cultural and Management Practices, 1977-78

Cultural and Management Practice	Proportion of Farms Using Various Harvesting Methods				
	North Island	Canterbury	South Canterbury	Southland	All Farms Average
Number of Survey Farms which Grew Wheat	(11)	(64)	(30)	(41)	(146)
	%	%	%	%	%
Wheat Crop Undersown with Clover	0	17	7	0	9
Fertilizer Applied at Drilling	100	89	100	100	95
Nitrogenous Fertilizer Applied at Drilling	82	33	27	66	44
Nitrogenous Fertilizer Topdressed	9	38	20	7	23
Weedicide Used	100	59	77	93	76
Insecticide Used	18	8	10	0	7
Fungicide Used	18	2	0	27	10
Wheat Irrigated	0	16	3	0	7
Grain Dried	9	2	3	0	2

As for the 1976-77 survey the survey results indicate that a large proportion of Canterbury and South Canterbury wheatgrowers used their own header to harvest their wheat crops. North Island and Southland farmers tended to favour the use of contract harvesting (Table 23). Overall, 62 per cent of farms used only their own header, 35 per cent used only a contractor, 2 per cent used both their own header and a contractor and 1 per cent sold their wheat standing.

TABLE 23

Harvesting Method, 1977-78

Harvesting Method Proportion of Farms Using Various Harvesting Methods					
Number of Survey Farms which grew Wheat	North Island (11)	Canterbury (64)	South Canterbury (30)	Southland (41)	All Farms Average (146)
	%	%	%	%	%
Own Header	27	73	83	37	62
Contractor	73	25	13	56	35
Own Header and Contractor	0	2	3	2	2
Sold Standing	0	0	0	5	1

CHAPTER 5

COSTS AND RETURNS

One of the objectives of the Wheat Growers' Survey is to provide a continuing set of statistics on economic aspects of wheat growing. The costs and returns presented in this chapter provide such information for comparison with the results of past and future surveys.

Although the costs outlined are reasonably comprehensive, no attempt has been made to present a total or complete cost-of-production figure. The figures presented include all major variable costs up to and including harvesting, and any on-farm cartage of wheat. In addition, an estimate of off-farm cartage cost was made, and overhead costs relating to farm machinery used on wheat were calculated.

The returns (revenue) from wheat growing were estimated from the price received for, or value of, wheat at the completion of harvesting. No storage increments were assessed and no costs relating to the storage of wheat were included. Retentions, levies and weighing costs were deducted from the wheat price.

For the purpose of tabulating the results the costs have been classified into the following groups:

1. Establishment Costs
2. Growing Costs
3. Harvesting Costs
4. Cartage Costs, and
5. Machinery Overhead Costs.

In Table 24 total variable costs are subtracted from total revenue to give a gross margin estimate. Machinery overheads are then subtracted to give a net return to the wheat enterprise.² Statistical information relating to the reliability of the survey estimates in Table 28 is listed in Appendix A.

In the short run, wheat should continue to be grown as long as it offers growers the promise of a sufficiently attractive gross margin relative to other stock and crop enterprises. In the longer run, however, growers are faced with the prospect of replacing machinery and if returns from wheat growing are not sufficiently high, enterprises with similar gross margins but with lower machinery inputs will become relatively more attractive. The allocation of machinery overheads has been undertaken so that the significance of this aspect of wheat growing may be assessed. In calculating machinery overheads, depreciation and average book value for the year have been determined on a "current cost" basis as well as by the traditional "historical cost" method. Under historical cost accounting, depreciation is a means of allocating the original cost of the asset concerned over its expected life. The aim in calculating "current cost" depreciation is to determine that dollar amount which would need to be set aside at the end of the year so that machinery operating capacity could be restored to its position at the start of the year. This is achieved by taking account of inflation in machinery prices.³ Book values arrived at by the "current cost" method more closely approximate market values.

² The "net return" might be interpreted as a return to land capital, management and other overheads (overheads excluding machinery).

³ See Appendix B, page 50.

The approach taken for this survey is that the relevant costs to be considered should be those which influence farmer decisions between competing crop and livestock enterprises. Land is assumed to be a fixed cost and no rental figure has been imputed.⁴ All costs are presented on a before-tax basis. Information for use in this report was collected from farmers well in advance of any taxation accounts being available so that all figures presented might be as current as possible. It should be noted that first year depreciation and investment incentives allowed for by the current taxation laws go some of the way toward transforming the normal historical cost (taxation) depreciation figures into "current cost" equivalents. However, they do not adequately bridge the gap (Richardson, 1977, Davey, 1978). Enterprises not undertaking new investment do not gain from such allowances.

The wheat enterprise costs and revenues for the four regions listed in Table 24 are averages of the calculated costs and returns per hectare of wheat drilled for individual survey farms in those regions. Table 25 lists the costs and returns on a per tonne harvested basis. As described previously⁵ the "All Farms Average" is a weighted average of the regional figures based on the proportion of wheat growing farms in each region (Table 4). Care should be taken in interpreting the North Island figures because of the small number of farms involved. A comparison of 1977-78 survey results with 1976-77 results is presented in Appendix D.

⁴ Although no rental figure has been imputed, average land values are presented in Chapter 2 (Table 6).

⁵ See Page 8.

TABLE 24

Summary Costs and Returns for the Wheat Crop
1977-78

Item	Average Cost (Return) (\$/ha)				
	North Island (11)	Canterbury (64)	South Canterbury (30)	Southland (41)	All Farms Average (146)
Number of Survey Farms which Grew Wheat					
1. Establishment Costs	102.89	58.59	67.55	87.01	71.74
2. Growing Costs	27.31	19.58	18.58	20.37	20.06
3. Harvesting Costs	56.35	21.75	19.63	52.65	32.62
4. Cartage Costs	26.49	11.35	12.95	11.61	12.69
5. Total Variable Costs ^a (1+2+3+4)	213.04	111.27	118.67	171.64	137.11
6. Machinery Overhead Costs (A) (Historical Cost Basis)	43.87	44.12	65.70	76.36	58.52
7. Machinery Overhead Costs (B) (Current Cost Basis)	69.37	68.90	95.87	113.38	88.21
8. Total Selected Costs (A) (5+6)	256.90	155.38	184.36	248.01	195.64
9. Total Selected Costs (B) (5+7)	282.41	180.16	214.54	285.03	225.32
10. Revenue	569.35	369.38	401.95	515.90	432.50
11. Gross Margin (10-5)	356.32	258.11	283.29	344.26	295.39
12. Gross Margin minus Machinery Overheads (A) (11-6)	312.45	213.99	217.59	267.90	236.86
13. Gross Margin minus Machinery Overheads (B) (11-7)	286.94	189.21	187.41	230.88	207.18

^a The cost of farm labour involved in tractor work, drilling and harvesting is included. Whereas tractor repairs and maintenance and machinery insurance was previously included as a variable cost they are included under "Machinery Overhead Costs" for this survey.

TABLE 25

Summary Costs and Returns per tonne for the Wheat Crop
1977-78

	Average Cost (Return) per tonne Harvested (\$/t)				
	North Island	Canterbury	South Canterbury	Southland	All Farms Average
Number of Survey Farms which Grew Wheat	(11)	(64)	(30)	(41)	(146)
1. Establishment Costs	19.96	20.40	21.40	20.58	20.65
2. Growing Costs	5.18	6.47	5.47	4.59	5.61
3. Harvesting Costs	10.70	7.65	5.95	11.80	8.70
4. Cartage Costs	5.18	3.75	3.98	2.88	3.62
5. Total Variable Costs (1+2+3+4)	41.04	38.28	36.79	39.84	38.59
6. Machinery Overhead Costs (A) (Historical Costs Basis)	9.08	15.21	19.97	17.81	16.67
7. Machinery Overhead Costs (B) (Current Cost Basis)	14.71	23.64	28.95	26.79	25.22
8. Total Selected Costs (A) (5+6)	50.22	53.49	56.76	57.65	55.26
9. Total Selected Costs (B) (5+7)	55.75	61.92	65.74	66.63	63.81
10. Revenue	106.87	119.47	116.90	115.73	117.02
11. Gross Margin (10-5)	65.83	81.19	80.10	75.89	78.44
12. Gross Margin minus Machinery Overheads (A) (11-6)	56.65	65.98	60.14	58.08	61.77
13. Gross Margin minus Machinery Overheads (B) (11-7)	51.12	57.55	51.15	49.10	53.22

Tables 26 and 27 indicate the importance, for the average farm, of various sources of revenue on a per hectare and per tonne basis respectively.

TABLE 26

Revenue per Hectare Drilled
1977-78

Source of Revenue	Average Revenue (\$/ha)				
	North Island	Canterbury	South Canterbury	Southland	All Farms Average
Number of Survey Farms which Grew Wheat	(11)	(64)	(30)	(41)	(146)
1. Wheat Board	56.54	345.81	376.68	453.75	367.63
2. Stock Feed	511.79	9.56	23.37	20.45	46.00
3. Seed	1.02	13.95	1.84	24.57	13.70
4. Sold Standing	0.00	0.00	0.00	17.13	5.14
5. Insurance Claimed	0.00	0.05	0.06	0.01	0.04
Total Revenue	569.35	369.38	401.95	515.90	432.50

TABLE 27

Revenue per Tonne Harvested
1977-78

Source of Revenue	Average Revenue (\$/t)				
	North Island (11)	Canterbury (64)	South Canterbury (30)	Southland (41)	All Farms Average (146)
1. Wheat Board	10.13	111.95	110.71	100.72	102.20
2. Stock Feed	96.54	3.54	5.67	5.53	10.18
3. Seed	0.20	3.96	0.50	5.38	3.40
4. Sold Standing	0.00	0.00	0.00	4.09	1.23
5. Insurance Claimed	0.00	0.02	0.03	0.00	0.01
Total Revenue	106.87	119.47	116.90	115.73	117.02

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APPENDICES

APPENDIX A

Reliability of Survey Results

This appendix provides information on the reliability of the major cost and revenue totals presented in Chapter 5.

The reliability of the various survey estimates are presented as Relative Standard Errors (R.S.E.). The R.S.E. of a particular estimated mean is interpreted as follows: It is 95 per cent certain that the true value of the mean is within the range ($2 \times \text{R.S.E.} \times \text{estimated mean}$). For example, the R.S.E. of the "All Farm Average" estimated gross margin is 3.0 per cent. Therefore, we may be 95 per cent sure that the true mean gross margin is within plus or minus $\$(2 \times 3.0\% \times 296.39) = \17.72 of the estimated mean (\$295.39).

TABLE 28

Relative Standard Errors (R.S.E.) of
Mean Estimates of Important Cost and Revenue Totals
1977-78

Item	North Island	Canterbury	South Canterbury	Southland	All Farms Average
Establishment Costs					
-mean (\$/ha)	102.89	58.59	67.55	87.01	71.74
-R.S.E. (%)	7.2	2.9	4.7	3.5	2.0
Growing Costs					
-mean (\$/ha)	27.31	19.58	18.58	20.37	20.06
-R.S.E. (%)	15.2	14.5	14.9	11.0	7.6
Harvesting Costs					
-mean (\$/ha)	56.35	21.75	19.59	52.65	32.62
-R.S.E. (%)	16.6	14.7	15.3	10.4	7.0
Cartage Costs					
-mean (\$/ha)	26.49	11.35	12.95	11.61	12.69
-R.S.E. (%)	5.7	5.6	7.9	9.2	2.9
Total Variable Costs					
-mean (\$/ha)	213.04	111.27	118.67	171.64	137.11
-R.S.E. (%)	6.5	4.4	3.6	4.4	2.4
Machinery Overhead Costs(A)					
-mean (\$/ha)	43.87	44.12	65.70	76.36	58.52
-R.S.E. (%)	18.0	8.6	11.2	11.8	5.9
Machinery Overhead Costs(B)					
-mean (\$/ha)	69.37	68.90	95.87	113.38	88.21
-R.S.E. (%)	19.1	8.2	10.6	10.9	5.6
Total Selected Costs (A)					
-mean (\$/ha)	256.90	155.38	184.36	248.01	195.64
-R.S.E. (%)	6.3	3.9	4.0	4.4	2.3
Total Selected Costs (B)					
-mean (\$/ha)	282.41	180.16	214.57	285.03	225.32
-R.S.E. (%)	6.6	4.1	4.6	4.6	2.5
Revenue					
-mean (\$/ha)	569.35	369.38	401.95	515.90	432.50
-R.S.E. (%)	6.5	3.4	5.2	4.0	2.2
Gross Margin					
-mean (\$/ha)	356.32	258.11	283.29	344.26	295.39
-R.S.E. (%)	9.0	4.8	7.0	5.3	3.0
Gross Margin Minus Machinery Overheads (A)					
-mean (\$/ha)	312.45	213.99	217.59	267.90	236.86
-R.S.E. (%)	11.4	6.0	9.1	5.9	3.7
Gross Margin minus Machinery Overheads (B)					
-mean (\$/ha)	286.94	189.21	187.41	230.88	207.18
-R.S.E. (%)	13.8	7.0	10.6	6.9	4.3

APPENDIX B

BREAKDOWN OF COST ITEMS

The breakdown of the cost items in Table 24, Summary Costs and Returns for the Wheat Crop, is detailed in Tables 29 to 33.

TABLE 29

Establishment Costs
1977-78

Item	Average Cost (\$/ha)				
	North Island (11)	Canterbury (64)	South Canterbury (41)	Southland (41)	All Farms Average (146)
(a) Cultivation and Drilling - Tractor Running Costs	10.60	10.48	12.57	11.55	11.27
(b) Cultivation and Drilling - Labour Cost	13.86	12.59	14.39	15.48	13.93
(c) Cultivation - Contractor Cost	3.38	0.46	0.00	1.37	0.81
(d) Drilling - Contractor Cost	2.24	0.22	0.00	0.28	0.31
(e) Seed Cost	39.05	24.57	27.81	33.82	28.93
(f) Seed Cartage	0.87	0.46	0.70	1.19	0.76
(g) Fertiliser Cost	30.67	8.75	10.82	21.23	14.27
(h) Fertiliser Cartage	2.22	1.06	1.25	2.09	1.48
Total Establishment Costs	102.89	58.59	67.55	87.01	71.74

TABLE 30
Growing Costs
1977-78

Item	Average Cost (\$/ha)				
	North Island (11)	Canterbury (64)	South Canterbury (50)	Southland (41)	All Farms Average (146)
Number of Survey Farms which Grew Wheat					
(a) Harrowing & Rolling- Tractor Running Cost	0.14	0.19	0.18	0.10	0.16
(b) Harrowing & Rolling- Labour Cost	0.21	0.24	0.22	0.13	0.20
(c) Fert. Topdressing- Tractor Running Cost	0.00	0.03	0.00	0.06	0.03
(d) Fert. Topdressing- Labour Cost	0.00	0.05	0.00	0.09	0.05
(e) Fert. Topdressing- Contractor Spreading Cost	0.76	0.72	0.49	0.00	0.46
(f) Fertiliser Cost	0.76	5.28	2.27	1.85	3.32
(g) Fert. Cartage Cost	1.01	1.46	0.69	0.62	1.01
(h) Spraying- Tractor Running Cost	1.26	0.17	0.11	0.35	0.27
(i) Spraying- Labour Cost	1.58	0.22	0.15	0.47	0.36
(j) Spraying- Contractor Cost	3.32	1.34	3.58	4.22	2.82
(k) Weedicide- Material Cost	15.94	6.65	9.43	10.79	9.06
(l) Insecticide- Material Cost	0.73	0.57	1.35	0.00	0.58
(m) Fungicide- Material Cost	1.60	0.04	0.00	1.70	0.62
(n) Irrigation- Running Cost	0.00	1.32	0.08	0.00	0.57
(o) Irrigation- Tractor Running Costs	0.00	0.18	0.00	0.00	0.08
(p) Irrigation- Labour Costs	0.00	1.12	0.03	0.00	0.48
<u>Total Growing Costs</u>	27.31	19.58	18.58	20.37	20.06

TABLE 31
Harvesting Costs
1977-78

Item	Average Cost (\$/ha)				
	North Island (11)	Canterbury (64)	South Canterbury (30)	Southland (41)	All Farms Average (146)
Number of Survey Farms which Grew Wheat					
(A) Dessication-Material Cost	0.30	0.13	0.00	0.00	0.07
(B) Dessication-Tractor Running Cost	0.00	0.00	0.00	0.00	0.00
(C) Dessication-Contract Application Cost	0.13	0.03	0.03	0.00	0.03
(D) Header-Fuel Cost	1.32	1.63	1.54	1.07	1.42
(E) Header-Tractor Running Cost	0.00	0.00	0.43	0.18	0.15
(F) Harvesting Labour (excluding Contractor)	2.70	4.10	5.21	3.97	4.22
(G) Heading Contractor Cost	44.87	12.04	6.62	29.29	17.99
(H) Paddock to Silo-Truck Fuel Cost	0.02	0.20	0.51	0.22	0.26
(I) Paddock to Silo-Tractor Running Cost	0.14	0.31	0.26	0.20	0.26
(J) Paddock to Silo-Truck Hire Cost	1.06	0.23	0.63	1.80	0.84
(K) Net Bag Cost	1.43	0.14	0.00	1.08	0.47
(L) Grain Drying-Farmer Equip. Running Cost	0.00	0.00	0.53	1.32	0.51
(M) Grain Drying-Contract Cost	3.68	0.94	1.68	11.45	4.42
(N) Crop Insurance Premium	0.70	1.97	2.16	2.09	1.97
Total Harvesting Costs	56.35	21.75	19.59	52.65	32.62

TABLE 32

Machinery Overhead Costs (A)
(Historical Cost Basis)
1977-78

Item	Average Cost (\$/ha)				
	North Island	Canterbury	South Canterbury	Southland	All Farms Average
Number of Survey Farms which Grew Wheat	(11)	(64)	(30)	(41)	(146)
(a) Repairs & Maintenance	9.35	10.82	11.68	13.76	11.81
(b) Depreciation - (15 per cent diminishing value method - historical cost basis)	22.20	21.41	34.74	40.26	30.04
(c) Interest on Average Book Value (at 9.0 per cent per annum)	12.32	11.88	19.28	22.34	16.67
Total Machinery Overheads (A)	43.87	44.12	65.70	76.36	58.52

TABLE 33

Machinery Overhead Costs Allocated (B)
(Current Cost Basis)
1977-78

Item	Average Cost (\$/ha)				
	North Island (11)	Canterbury (64)	South Canterbury (30)	Southland (41)	All Farms Average (146)
Number of Survey Farms which Grew Wheat					
(a) Repairs & Maintenance	9.35	10.82	11.68	13.76	11.81
(b) Depreciation (15 per cent diminishing value method current cost basis)	39.49	38.21	55.40	65.55	50.27
(c) Interest on Average Book Value (at 9.0 per cent per annum)	20.53	19.86	28.79	34.07	26.13
Total Machinery Overheads (B)	69.37	68.90	95.87	113.38	88.21

APPENDIX C

Description of Cost and Revenue Items1. Establishment Costs

(a) Cultivation and Drilling Tractor Running Costs:

Tractor running costs for the survey farms were estimated as follows:

For tractors 60 h.p. or less, running cost = \$1.97/hour

For tractors 61 - 85 h.p., running cost = \$2.54/hour

For tractors greater than 85 h.p., running cost = \$3.10/hour.

These running costs do not include insurance, registration, or any major repairs. Diesel fuel was costed at 17.2c/litre.

(b) Cultivation and Drilling - Labour Cost:

Total labour time for cultivation and drilling was determined from the tractor hours and the number of people involved. This time was costed at \$2.91 per hour based on the average salary (\$5065) of full time employees on survey farms, plus an allowance of \$28.50 per week for housing etc.

(c) Cultivation - Contractor Cost:

The actual amount paid for any contract work was used.

(d) Drilling - Contractor Cost:

The actual amount paid for any contract drilling was used.

(e) Seed Cost:

For each farm the total seed cost was the sum of purchased and farm grown seed. The cost of purchased seed was taken to be the actual retail seed price which includes any costs for dressing, treating, and bags. The cost of farm grown seed was generally taken as the previous year's milling price plus any storage increments which would have accrued up to the sowing date plus any costs related to dressing and treating the seed. An exception to this method was made where the wheat seed was retained from a crop grown specifically for seed in which case the actual value of the seed was used.

(f) Seed Cartage:

"Seed Cartage" is the cost of transporting seed to the farm. Where a grower used his own transport this was charged at the appropriate commercial transport rate for the area.

(g) Fertiliser Cost:

"Fertiliser Cost" refers to that fertiliser applied at drilling. The cost was determined as the "Works Price" minus any appropriate spreading or price subsidies. The Government subsidies for spreading fertiliser applying at the time of the first visit (up to drilling) were:

\$8.50 per tonne for commercial aerial spreading
\$4.00 per tonne for contract ground spreading
\$2.50 per tonne for farmer spreading.

(h) Fertilizer Cartage:

"Fertilizer Cartage" includes both the actual cost of cartage plus any additional purchase price where the fertilizer was bought from a depot rather than directly from the works. The transport subsidy based on the distance from the Fertilizer Works to the farm was deducted. Where farmers carted their own fertilizer, appropriate commercial rates were used to determine the cost.

2. Growing Costs

(a) Harrowing and Rolling - Tractor Running Cost

Where harrowing and/or rolling of the newly established wheat crop was carried out, tractor running costs were determined as for "Cultivation and Drilling-Tractor Running Costs" under Establishment Costs 1 (a).

(b) Harrowing and Rolling - Labour Cost

Labour associated with any harrowing and/or rolling of the established wheat crop was costed as for Establishment Cost 1 (b).

(c) Fertilizer Topdressing - Labour Cost

Labour for topdressing fertilizer was costed as

under Establishment Costs 1 (b).

(e) Fertilizer Topdressing - Contract Spreading Cost

The contract spreading cost is the actual amount paid by the farmer (before deduction of spreading subsidy).

(f) Fertilizer Cost

This item refers to the cost of fertilizer topdressed onto the growing crop. The amount was determined as in Establishment Costs 1 (g).

(g) Fertilizer Cartage Cost

Fertilizer cartage cost for fertilizer topdressed onto the growing crop was calculated as under Establishment Costs 1 (h).

(h) Spraying - Tractor Running Cost

Where spraying was carried out using a tractor the tractor running cost was determined as for Establishment Costs 1 (a).

(i) Spraying Labour Cost

Farm Labour involved in spraying operations was costed as under Establishment Costs 1 (b).

(j) Spraying - Contractor Cost

Amount paid for contract spraying of wheat crop.

(k) Weedicide - Material Cost

(l) Insecticide - Material Cost

(m) Fungicide - Material Cost

(n) Irrigation - Running Cost

Where any irrigation plant used an electric, deisel or petrol motor the estimated cost was included under this heading.

(o) Irrigation - Tractor Running Costs

Where a tractor was used for pumping or rebordering the tractor running cost was determined as described under Establishment Costs 1 (a).

(p) Irrigation - Labour Costs

Farm labour involved in irrigation was costed as for Establishment Costs 1 (b).

3. Harvesting Costs

(a) Header Fuel Cost

This is the estimated fuel cost of harvesting where a grower used his own self-propelled header. Deisel = 17.2^c per litre. Petrol = 29.4^c per litre, minus tax rebate.

(b) Header - Tractor Running Costs

Where a grower's own header was tractor-pulled the tractor running cost was calculated as described

under Establishment Costs 1 (a).

(c) Harvesting Labour

All farm labour (not contractors) involved in harvesting was costed at \$2.91 per hour as outlined in Establishment Costs 1 (b).

(d) Heading - Contract Cost

This covers the total contract cost to the farmer and includes the actual harvesting cost (machinery plus labour) and in some cases cartage to the farmer's silo.

(e) Paddock to Silo - Truck Fuel Cost

This item refers to on-farm cartage of the wheat to the farmer's silo.

(f) Paddock to Silo - Tractor Running Cost

Tractor running costs of cartage of harvested wheat to the silo was determined as outlined under Establishment Costs 1 (a).

(g) Paddock to Silo - Truck Hire Cost

This item includes the cost of hire of trucks or trailers to take wheat from the paddock to the silo where this was not included in the contract heading cost.

(h) Net Bag Cost

Although most wheat is harvested in bulk some is

bagged. The cost of the bags involved was entered as the purchase price minus the salvage value after use.

(i) Grain Drying - Farmer Equipment Running Cost

Where a grower dried wheat and used his own equipment the estimated fuel or electricity cost was entered under this heading.

(j) Grain Drying - Contract Cost

Where grain was contract dried, the cost of drying plus any additional cartage required was entered.

(k) Crop Insurance Premium

4. Cartage Costs

Actual cartage costs for wheat were not available for most farms at the time the survey was undertaken. Hence, the cartage costs presented are imputed values. The total amount of wheat harvested is assumed to be carted to the nearest rail station at the appropriate commercial rate for the area. For wheat which is to be sold to the Wheat Board this should be an accurate estimate of the true cost since the Wheat Board Price for wheat is a f.o.r. price. Of the wheat not sold to the Wheat Board some might be expected to be retained on the farm as seed or feed but a major portion is sold off-farm.

5. Total Variable Costs

This is the sum of Establishment Costs, Growing

Costs, Harvesting Costs and Cartage Costs. It should be noted that certain farm labour associated with the wheat enterprise has been included as a variable cost.

6. Machinery Overhead Costs (A)

Machinery overhead costs are allocated to the wheat enterprise on the basis of usage. This was determined as follows:

$$\text{Tractors and Headers} = \frac{\text{hours on wheat}}{\text{total hours for the year}}$$

$$\text{Irrigation Equipment} = \frac{\text{area of wheat irrigated}}{\text{total area irrigated with the same equipment}}$$

Cultivation and Spraying

$$\begin{array}{l} \text{Equipment, Trucks,} \\ \text{Drills, Trailers,} \\ \text{Grain Augers, etc.} \end{array} = \frac{\text{area of wheat}}{\text{total area cultivated for the year.}}$$

(a) Repairs and Maintenance

This item includes repairs and maintenance on all machinery and equipment used on the wheat enterprise for the 77-78 wheat crop year. Insurance at 0.5167 per cent of cost is also included.

(b) Depreciation

For Machinery Overhead Costs (A) depreciation was calculated by the diminishing value method (15 percent per annum) based on the historical cost. Depreciation in year $n = \text{Cost}_0 \times (0.85)^{n-1} \times 0.15$ where Cost_0 is the historical cost.

(c) Interest on Average Capital

Using the diminishing value depreciation method outlined under (b) an average book value (depreciated) was determined for each item of plant and machinery used on wheat. The interest on average capital was then imputed at 9.0 per cent. This is a weighted average of (1) the average overdraft interest rates of Trading Banks applying to Agriculture at September 1977, and (2) the normal rate being charged by Stock and Station Agents at that time.

7. Machinery Overhead Costs (B)

Machinery overhead costs are allocated to the wheat enterprise as described under item 6 "Machinery Overhead Costs (A)".

(a) Repairs and Maintenance

As described under item 6 "Machinery Overhead Costs (A)".

(b) Depreciation

For Machinery Overhead Costs (B) depreciation was calculated on a current cost basis. The historical cost of machinery used on the wheat enterprise was inflated by a machinery price index⁶ and diminishing value depreciation (15 per cent) was then calculated from the updated cost.

⁶ The Statistics Department publishes a Farming Capital Expenditure Index dating from 1971. Hussey & Philpott (1970) in updating previous work on productivity and income in New Zealand Agriculture, presented a plant and machinery prices index for the period 1921/22 to 1968/69. The Ministry of Agriculture and Fisheries (Johnson, R. W. M., 1977) has extended this index and linked it to the combined Transport Vehicles and Tractors and Farm Machinery series of the Statistics Department Farming Capital Expenditure Price Index.

$$\text{Depreciation in year } n = \text{Cost}_o \times \frac{I_n}{I_o} \times (0.85)^{n-1} \times 0.15$$

Where Cost_o = historical cost (year $n = 0$)

I_n = inflation index at the end of year n , and

I_o = inflation index at the time of purchase
(year $n = 0$).

(c) Interest on Average Capital

Interest on Average Capital was determined as described previously under Machinery Overhead Costs (A). However, for Machinery Overhead Costs (B), the book values were determined by the current cost method outlined under (b) above.

APPENDIX D

SUMMARY OF 1976/77 AND 1977/78 SURVEY ESTIMATES

Table 34 presents some of the key survey estimates for the two surveys completed to date.

TABLE 34

Summary of 1976/77 and 1977/78 Survey Estimates

Item	Survey Year ^a	
	1976/77	1977/78
Total Farm Area (ha)	229.0	225.0
Capital Value of Farm (\$)	-	259,424
Wheat Area Harvested (ha)	22.5	21.2
Total Cash Crop Area Harvested (ha)	51.7	50.0
Total Wheat Production (t)	87.90	79.29
Average yield (t/ha)	3.91	3.72
Total Stock Units at June 30	1926	1946
Total Stock Units at Dec. 30	-	2552
Wheat Revenue (\$/ha)	406.72	432.50
Wheat Variable Costs (\$/ha)	127.32	137.11
Wheat Gross Margin (\$/ha)	279.46	295.39

^a The survey year extends from the commencement of drilling (approximately May) through to the completion of harvesting (March-April) the following calendar year.

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