

AN ECONOMIC SURVEY
OF NEW ZEALAND WHEATGROWERS :
ENTERPRISE ANALYSIS

SURVEY NO. 4

1979-80

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THE AGRICULTURAL ECONOMICS RESEARCH UNIT
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PREFACE

This Report is the fourth 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, management practices and costs and returns for the 1979-80 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. A comparison of this information with past surveys enables a more comprehensive profile of the industry to emerge.

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 by Roger Lough, Patrick McCartin and Robyn MacLean. Computer programming and analysis was undertaken by Patrick McCartin and the Report was compiled by Roger Lough and Michael Rich.

J. B. Dent
Director

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 the Wheat Growing Sub-Section of Federated Farmers of New Zealand Inc. This report summarises information collected from participating farmers for the 1979-80 wheatgrowing season.

1.1 Climatic Conditions

Wright¹ provided the following details on weather conditions in the various regions:

North Island (western regions)

After wet weather in early spring, which caused delays in sowing, conditions were more favourable from mid October. Crops benefited from warm rains at New Year. The weather was changeable in February but good progress was made in harvesting, and yields were high.

Nelson - Marlborough

After a favourable autumn, there was little heavy rain until late in July. Spring sowings were delayed by wet weather, and the spring rainfall was above average, but by early January there was almost a drought. Rain late in January was good for late-sown crops. The harvest was drawn out by periods of unsettled weather, but yields were satisfactory.

¹ Wright, G.M., Crop Research Division, D.S.I.R., pers. comm. 1980.

2.

Canterbury

Much sowing planned for May was delayed until June by wet weather, but then completed without difficulty. The late 1979 harvest in South Canterbury prevented some areas from being sown back to grass, and led to an increase in wheat area. There was little rain in early spring, but falls late in October improved crop prospects. A hot dry spell in December was followed by storms with heavy rain, the weather was rather unsettled for most of the harvest, and some crops in South Canterbury were not harvested until April.

Otago and Southland

Good conditions were reported for spring sowing. High January rainfall caused extensive flooding, but February weather was normal. Heavy rains in March caused harvesting delays.

One method of gaining an overall picture of the climatic conditions as they relate to wheat growing is to weight information from various meteorological stations throughout the country by the area of wheat grown in the vicinity of those stations. This is shown in Table 1, for rainfall, temperature, sunlight, and days of soil moisture deficit. Regional climatic data are presented in Appendix A.

TABLE 1

Weather Indices for New Zealand
Wheat Growing Areas^a 1979-80

Month	Rainfall	Average Temperature	Soil Moisture Deficit	Sunshine
	Percent of normal ^c	Deviation from normal ^c (°C)	Days ^b	Percent of normal ^c
March	182	0.0	3.6	58
April	51	+0.3	1.0	116
May	184	-0.4	0.3	84
June	38	+1.0	-	102
July	105	+1.5	-	101
August	149	-0.6	-	80
September	78	+0.3	-	85
October	169	-0.4	-	83
November	80	+0.8	0.2	97
December	98	+0.4	2.9	110
January	169	+0.1	3.7	92
February	83	-0.6	8.6	91
March	175	-0.9	0.9	86
April	164	+0.2	0.7	93

a Weighted by county wheat areas in 1967-68.

b The number of "days of deficit" is calculated from daily rainfall data by assuming that evapotranspiration continues at the Thornthwaite potential evapotranspiration rate until 75 mm of soil moisture have been withdrawn. Thereafter, days of deficit are counted until there is a day with rainfall in excess of the daily potential evapotranspiration.

c 1941-70.

Source: Maunder, W.J., N.Z. Meteorological Service, pers. comm., 1980.

4.

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.

1.2.1 Announced Prices.

The delivery prices to be paid for milling standard wheat f.o.r. grower's station, shown in Tables 2 and 3, are fixed by Government and are announced prior to sowing. They also become the maximum prices that may be paid for lower quality wheat. Table 2 shows the long term trend in basic wheat prices; that is, the announced price for wheat varieties : Aotea, Kopara and their equivalents.

In April 1980 the Minister of Trade and Industry announced that starting with the 1981 Harvest the basic wheat price paid to growers would be a three year moving average of the New Zealand equivalent of the f.o.b. price for Australian standard white wheat. The calculation of the basic price includes the last two seasons actual prices and an estimated price for the coming season announced in December. The scheme also provided for a minimum price which in any season will be 90 per cent of the price paid to growers in the previous season. As a transitional measure a minimum basic price of \$167 per tonne for 1981 was announced.

TABLE 2
Basic Wheat Price Trend

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	127.50
1980	140.00
1981	167.00

The announced prices in Table 3 show that, relative to the basic wheat price, Hilgendorf and Arawa have remained static over the last three harvest years. That is, Hilgendorf retained a 20 per cent premium and Arawa a 5 per cent discount. The Karamu discount remained at its 1980 level of 15 per cent for South Island growers but was reduced to 7.5 per cent for North Island growers for the 1981 harvest.

TABLE 3

Announced Wheat Price Details

Variety	Harvest Year				
	1979	1980	1981	1979- 1980	1980 - 1981
	\$/tonne	\$/tonne	\$/tonne	% change	% change
Aotea, Kopara & equivalent	127.50	140.00	167.00	+ 9.8	+19.3
Hilgendorf	153.00	168.00	200.40	+ 9.8	+19.3
Arawa	121.13	133.00	158.65	+ 9.8	+19.3
Karamu					
S.I. Growers	114.75	119.00	141.95	+ 3.7	+19.3
N.I. Growers	114.75	119.00	154.47	+ 3.7	+29.8

1.2.2 Levies

The announced prices are subject to a maximum 10 per cent levy struck on the basic wheat price by the Wheat Board to offset any losses made from exporting wheat. In 1979-80 this amounted to \$2 per tonne. Table 4 sets out the additional wheat levies payable by growers during 1979-80.

TABLE 4

Additional Wheat Levies, 1979-80

	<u>\$/ per tonne</u>
Wheat Research Institute	0.18
Wheatgrowers Compensation Fund	0.15
United Wheatgrowers (NZ) Ltd	0.14
Federated Farmers of NZ Inc	0.03
Total	0.50

1.2.3 Monthly Storage Increments

For the 1979-80 season, the Department of Trade and Industry approved an increase in the rate of payment of storage increments from 1.25 per cent per month of the basic wheat price to 1.50 per cent per month. Payment on wheat grown north of a line drawn from Waikouaiti to Queenstown, South Island, is given in Table 5. Increment payments on wheat grown south of the Waikouaiti to Queenstown line apply one month later.

TABLE 5

Growers' Storage Increments

Date Sold		Storage Increment (\$ per tonne)		
		1978	1979	1980
April	1-15	2.03	2.39	3.15
	16-30	2.70	3.19	4.20
May	1-15	3.38	3.98	5.25
	16-31	4.05	4.78	6.30
June	1-15	4.73	5.58	7.36
	16-30	5.40	6.38	8.40
July	1-15	6.08	7.17	9.45
	16-31	6.75	7.97	10.50
August	1-15	7.43	8.77	11.55
	16-31	8.10	9.56	12.60
September	1-15	8.78	10.36	13.65
	16-30	9.45	11.16	14.70
October	1-15	10.13	11.95	15.75
	16-31	10.80	12.75	16.80
November	1-15	11.48	13.55	17.85
	16-30	12.15	14.34	18.90

1.3 Survey Description

The sampling unit for the survey is a wheatgrowing farm. For the purpose 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 were available. Since the Wheat Board had not finished purchasing wheat from the 1979 harvest at the time the sample was finalised, the most recent five year period which records were available was 1974 to 1978. Approximately 75 per cent of those who participated in the 1978-79 survey (Survey No. 3) were retained for the 1979-80 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 1979-80 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 1979-80 were retained in the sample.

1.3.1 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 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).

1.3.2. Survey Farm Distribution

Table 6 compares the regional distribution of surveyed farms with the estimated regional distribution of all wheat growing farms. Since wheat may have been sold under more than one name from the same farm over the 1974 to 1978 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 total number of wheatgrowing farms which occur in each region, it was assumed 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. Some caution should be exercised in interpreting North Island results because of the number of farms surveyed.

TABLE 6

Distribution of Survey Farms
and Survey Population by Region, 1979-80

	Total Number of Wheatgrowers	Number of Farms Surveyed	Proportion of Farms Surveyed	Estimated Proportion of Total Farms
North Island ^a	351	16	0.11	0.05
Canterbury	2,983	76	0.41	0.42
South Canterbury	1,489	32	0.19	0.21
Southland	2,265	51	0.29	0.32
	<u>7,088</u>	<u>175</u>	<u>1.00</u>	<u>1.00</u>

a

The number of farms to be surveyed, based on the estimated proportion of total farms in the region, results in a small sample size problem. This problem was reduced by surveying 10 additional farms and this is why the proportion of farms surveyed is significantly greater than the estimated proportion of total farms in the North Island.

1.3.3 Weighting

In order to report unbiased sample statistics, estimates of farm characteristics were obtained by taking each survey farm characteristic and then calculating the average for all farms. For example yield per hectare was obtained by averaging the individual farm yields instead of simply dividing the total wheat production by total farm area.

If a national picture of New Zealand wheatgrowing is wanted, then each region must assume its correct degree of importance. This is done by using the estimated proportion of total farms in each region (Table 6) to weight regional survey results so as to give an "all regions" average result. This result is presented in most tables within this report.

CHAPTER 2

FARM CHARACTERISTICS

This chapter outlines some general survey farm characteristics. The figures presented are averages for all survey farms and hence include some farms which did not grow wheat in the 1979-80 season.

Table 7 shows the number of survey farms which did and did not grow wheat in 1979-80. Owing to deaths, the sale of properties and the unavailability of participants between Spring and Autumn visits, the number of survey farms which drilled wheat was greater than the number which harvested wheat.

TABLE 7

Classification of Farms Surveyed, 1979-80

	North Island	Canterbury	South Canterbury	Southland	All Regions
Farms which drilled wheat	14	60	30	51	154
Farms which harvested wheat	13	59	28	49	149
Farms which did not grow wheat	3	17	4	2	26
Total	16	76	32	51	175

2.1 Property Values

Tables 8 and 9 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 8

Government Valuation of Survey Farms^a

	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms	16	76	32	51	175
Land Value (\$)	309,534	241,231	208,006	174,379	216,276
Value of Improve- ments (\$)	129,047	80,228	87,138	93,752	88,448
Capital Value (\$)	438,581	321,459	295,144	268,131	304,724

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

TABLE 9

Government Valuation per Hectare

	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms	16	76	32	51	175
Land Value (\$/ha)	1,152	1,348	1,342	1,004	1,227
Value of Improvements (\$/ha)	422	451	485	531	482
Capital Value (\$/ha)	1,574	1,799	1,827	1,535	1,709

2.2 Crop Areas and Production

Table 10 shows average farm areas and crop areas harvested in the 1980 harvest. Compared to the 1978-79 survey, the "all regions" average wheat area harvested was up 14.2 per cent. Some of this increase was at the expense of barley which declined 13.8 per cent. As in previous seasons, wheat (22.5 hectares) and barley (10.0 hectares) were the major crops. Small seeds also showed a significant increase with grass seed up by 22.9 per cent and white clover up 81.0 per cent. Wheat area harvested was up 26.0 per cent in the North Island and 5.9 per cent in Canterbury, 23.4 per cent in South Canterbury and 17.9 per cent in Southland.

TABLE 10

Farm and Crop Areas, 1979-80

	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms	16	76	32	51	175
<u>Farm Area</u>					
Total Farm Area (ha)	473.8	211.4	187.5	209.8	219.0
Potential Cropping Area (ha)	221.3	174.9	167.2	178.3	176.7
Potential Cropping Area as a Prop'n of Total Farm Area (%)	56	87	88	85	85
<u>Cash Crop: Area Harvested</u>					
Wheat Area (ha)	21.3	23.1	25.8	19.8	22.5
Barley Area (ha)	17.7	13.6	11.7	3.1	10.0
Seed Peas Area (ha)	2.4	10.8	9.1	0.9	6.8
Vining Peas Area (ha)	1.4	0.9	2.1	0.0	0.9
Oats Area (ha)	1.4	2.8	4.0	2.5	2.9
Linseed Area (ha)	0.0	0.3	0.1	0.0	0.2
Oilseed Area (ha)	0.1	0.2	0.8	0.0	0.3
Potatoes Area (ha)	0.0	0.3	2.2	0.0	0.6
Maize Area (ha)	0.0	0.0	0.0	0.0	0.0
Grass Seed Area (ha)	2.3	7.1	5.4	0.3	4.3
Clover Seed Area (ha)	1.1	11.7	7.9	0.1	6.7
Other Cash Crop Area (ha)	0.5	1.4	1.7	0.9	1.3
Total Cash Crop Area Harvested (ha)	48.2	72.2	70.8	27.6	56.5
Wheat Area as a Prop'n of Total Cash Crop Area (%)	44	32	36	72	40

Average wheat areas drilled and production for all survey farms in 1979-80 are shown in Table 11. These details for only those farms which grew wheat are given in Chapter 3.

Relative to 1978-79, the "all regions" average wheat area drilled increased by 16.3 per cent to 23.5 hectares. This area is slightly larger than the 22.5 hectares harvested shown in Table 10 because over 4 per cent of wheat area drilled was not harvested. Since all survey farms are included, production is a function of the number of farms growing wheat and the average total yield on those farms, and this increased by 23.1 per cent to 84.51 tonnes.

Average areas and yields for crops other than wheat are presented in Table 12.

TABLE 11

Wheat Area, Production and Yield
on All Survey Farms, 1979-80

	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms	16	76	32	51	175
Area Drilled (ha)	21.6	23.1	29.0	20.8	23.5
Production (tonnes)	91.19	79.66	82.33	91.27	84.51

TABLE 12
Other Crop Yields by Region, 1979-80

Crop	North Island			Canterbury		
	No. of farms Which Recorded Yield	Area Harvested ^a (ha)	Av. Yield ^b (tonnes/ ha)	No. of Farms Which Recorded Yield	Area Harvested ^a (ha)	Av. Yield ^b (tonnes/ ha)
Barley	10	17.70	4.29	54	13.56	3.53
Peas (seed)	4	2.43	1.84	39	10.80	2.65
Peas (vining)				4	0.95	2.08
Oats	3	1.40	3.07	24	2.77	2.90
Linseed				3	0.34	2.30
Oilseed Rape				3	0.23	2.21
Potatoes				5	0.35	21.58
Maize						
Grass Seed (md)	3	2.25	0.59	38	7.10	0.67
Clover Seed (md)				38	11.71	0.29
	South Canterbury			Southland		
Barley	22	11.72	3.34	17	3.07	4.43
Peas (seed)	9	9.08	2.39	6	0.86	2.82
Peas (vining)	3	2.09	4.19			
Oats	10	3.96	3.86	17	2.55	5.21
Linseed						
Oilseed Rape	2	0.82	1.87			
Potatoes	4	2.22	30.87			
Maize						
Grass Seed (md)	13	5.44	0.74			
Clover Seed (md)	12	7.87	0.27			
	All Regions Average					
Barley	103	10.02	3.60			
Peas (seed)	58	6.56	2.71			
Peas (vining)	7	0.91	2.84			
Oats	54	2.07	4.98			
Linseed	3	0.17	2.15			
Oilseed Rape	5	0.27	2.05			
Potatoes	9	0.61	27.70			
Maize						
Grass Seed (md)	54	4.24	0.67			
Clover Seed (md)	50	6.63	0.29			

^a Average for all 175 survey farms

^b Average for farms which recorded
a yield.

2.3 Livestock Numbers

Average livestock numbers and total stock units per farm are presented as at June 30, and at December 31 (Table 13). A comparison of these June figures with the previous survey shows that, for all regions, the number of cattle and ewes decreased while other sheep numbers increased. Although total stock units declined from 1889 to 1823, the stock units per hectare, on farms which grew wheat, increased from 12.26 to 13.11.

On those farms which grew wheat, the lambing percentage increased relative to 1978-79 survey figures and the stocking rate was greater than the 8.55 stock units per hectare recorded on non wheat producing farms. A comparison of total stock units by region with 1978-79 survey figures, shows that stock numbers rose in the North Island, fell in South Canterbury, and remained relatively static in both Canterbury and Southland.

TABLE 13
Livestock Numbers, 1979-80

	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms	(16)	(76)	(32)	(81)	(175)
<u>Farm Area</u>					
Total Farm Area (ha)	473.8	211.4	187.5	209.8	219.0
<u>Livestock Numbers at 30.6.79</u>					
Ewes	2,098	1,204	869	1,769	1,359
Other Sheep	1,114	382	433	583	493
Total stock Units ^a	3,940	1,574	1,188	2,237	1,823
Stock Units per Available Spring Grazing Area (S.U./ha)					
a) Wheat Farms	14.80	13.10	11.18	14.11	13.11
b) Non Wheat Farms	7.7	8.9	9.50	-	8.55
Lambing %					
a) Wheat Farms	94	109	118	117	112
b) Non Wheat Farms	92	108	117	-	105
<u>Livestock Numbers at 31.12.79</u>					
Ewes	2,061	1,314	947	2,090	1,523
Other Sheep	1,650	1,028	813	2,024	1,332
Cattle	285	34	6	37	42
Total stock Units ^a	4,296	2,088	1,477	3,473	2,513
Stock Units per Available Summer Grazing Area (S.U./ha)					
	15.49	19.19	17.13	21.19	19.22

^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.

CHAPTER 3

CHARACTERISTICS OF WHEAT PRODUCTION

This chapter deals with wheat area and yield for only those survey farms which grew wheat in the 1979-80 season. These farms totalled 154 when growing was identified with drilling and 149 when growing was identified with harvesting.

3.1 Wheat Area and Production

Table 14 shows that the "all regions" average survey farm, which harvested wheat in 1979-80, drilled 27.7 hectares of wheat and produced 98.87 tonnes at an average farm yield of 3.74 tonnes per hectare. This yield was 11.6 per cent more than the 3.35 tonnes per hectare recorded for the 1978-79 survey.

The distribution of survey farms which harvested wheat by area drilled is shown in Table 15 and Figure 1. Seventy per cent of survey farms which drilled wheat, drilled less than 30 hectares.

TABLE 14

Wheat Area, Production and Yield
on Survey Farms which Harvested Wheat, 1979-80

	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	(13)	(59)	(28)	(49)	(149)
Area Drilled (ha)	26.5	29.8	33.2	21.6	27.7
Production (tonnes)	112.24	102.62	94.09	95.00	98.87
Yield (tonnes/ ha)	4.22	3.50	2.92	4.53	3.74

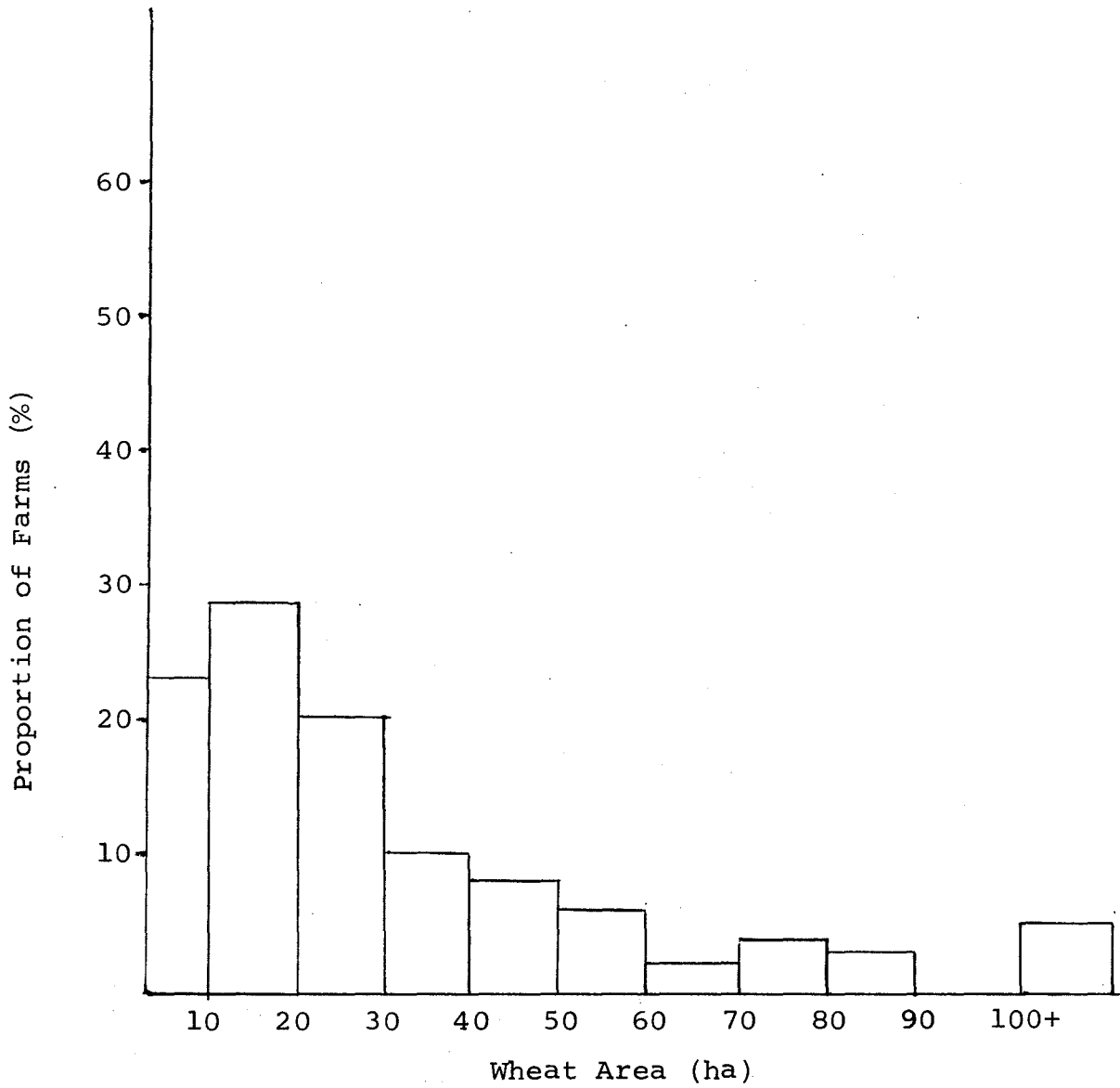
TABLE 15

Distribution of Wheat Area Drilled, 1979-80

	Proportion of Farms (%)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Drilled Wheat	(14)	(60)	(28)	(52)	(154)
<u>Wheat Area Drilled (ha)</u>					
0- 9.99	21.43	16.67	28.57	32.69	24.53
10-19.99	50.00	25.00	17.86	32.69	27.21
20-29.99	21.43	25.00	10.71	15.38	18.74
30-39.99	0.00	10.00	14.29	7.69	9.66
40-49.99	0.00	8.33	7.14	5.77	6.85
50-59.99	0.00	3.33	10.71	1.92	4.27
60-69.99	0.00	0.00	3.57	0.00	0.75
70-79.99	0.00	5.00	3.57	1.92	3.47
80-89.99	0.00	3.33	0.00	0.00	1.40
90-99.99	0.00	0.00	0.00	0.00	0.00
100 & above	7.14	3.33	3.57	1.92	3.12
Total	100.00	100.00	100.00	100.00	100.00

FIGURE 1

Distribution of Wheat Area Drilled, 1979-80



Because some wheat is not of sufficiently high quality and because some is retained for seed, the Wheat Board does not purchase the total wheat production in any year. Table 16 gives an estimate of the amount of wheat sold per farm to the Wheat Board from the 1980 harvest. From an average total production of 98.87 tonnes, 81 per cent or 84.84 tonnes was estimated as being sold to the Wheat Board from the 1980 harvest. This compares with 77 per cent for the 1978-79 survey. Forty three per cent of total wheat production from North Island survey farms was expected to be sold to the Wheat Board compared to the 16 per cent sold to the Wheat Board during 1978-79, and the 1.8 per cent in 1977-78.

TABLE 16

Estimated Wheat Production Sold to the
Wheat Board per Farm, 1980 Harvest

	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	(13)	(59)	(28)	(49)	(149)
Total Production (tonnes)	112.24	102.62	94.09	95.00	98.87
Estimated Wheat sold to the Wheat Board ^a (tonnes)	76.01	85.25	90.05	82.26	84.84
Wheat Sold to Wheat Board as a Proportion of Total Prod'n. (%)	43	80	93	80	81

^a This is an estimate based on wheat which had been sold at the time of the second survey visit (post harvest) plus any which was still in store, taking into account quality and own seed requirements.

3.2 Wheat Varieties, Areas and Yields

Table 17 and Figure 2 show that on the "all regions" average farm, Kopara was the most important variety making up over 39 per cent of the total wheat drilled. This was followed by Takahe (27 per cent), Karamu (14 per cent), Hilgendorf (7 per cent) and Arawa (6 per cent).

The proportion of Takahe drilled increased from 12 per cent in 1977-78 to 20 per cent in 1978-79 and 27 per cent in 1979-80, while Aotea decreased from 15 per cent to 3 per cent over the same period. The proportion of Karamu drilled represents an 8 per cent reduction compared to last year. Of interest is the re-emergence of Arawa as a preferred variety, especially in Canterbury where the area drilled increased from 5 per cent in 1978-79 to 13 per cent in 1979-80.

TABLE 17

Wheat Varieties by Proportion of
Wheat Area Drilled, 1979-80

	Proportion of Wheat Area Drilled (%)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Drilled Wheat	(14)	(60)	(28)	(52)	(154)
<hr/>					
<u>Wheat Variety</u>					
Kopara	2.9	51.6	52.4	16.3	38.4
Karamu	82.5	9.7	25.8	0.0	13.9
Aotea	0.0	1.9	4.0	5.1	3.3
Takahe	0.0	0.5	9.6	77.5	26.6
Hilgendorf	0.0	15.9	2.0	1.1	7.3
Gamenya	4.3	1.3	0.7	0.0	0.9
Arawa	0.0	13.4	1.0	0.0	5.7
Oroua	5.0	1.8	0.6	0.0	1.1
Rongotea	5.3	1.1	0.5	0.0	0.8
Other	0.0	2.8	3.4	0.0	2.0
Total	100.0	100.0	100.0	100.0	100.0

Table 18 presents wheat area and yield per hectare for the different varieties recorded on the survey. Where a single crop of any variety has been grown in a region the details have been deleted from the regional analysis but included in the "all regions" figures.

FIGURE 2

Wheat Varieties by Proportion of
Wheat Area Drilled, 1979-80

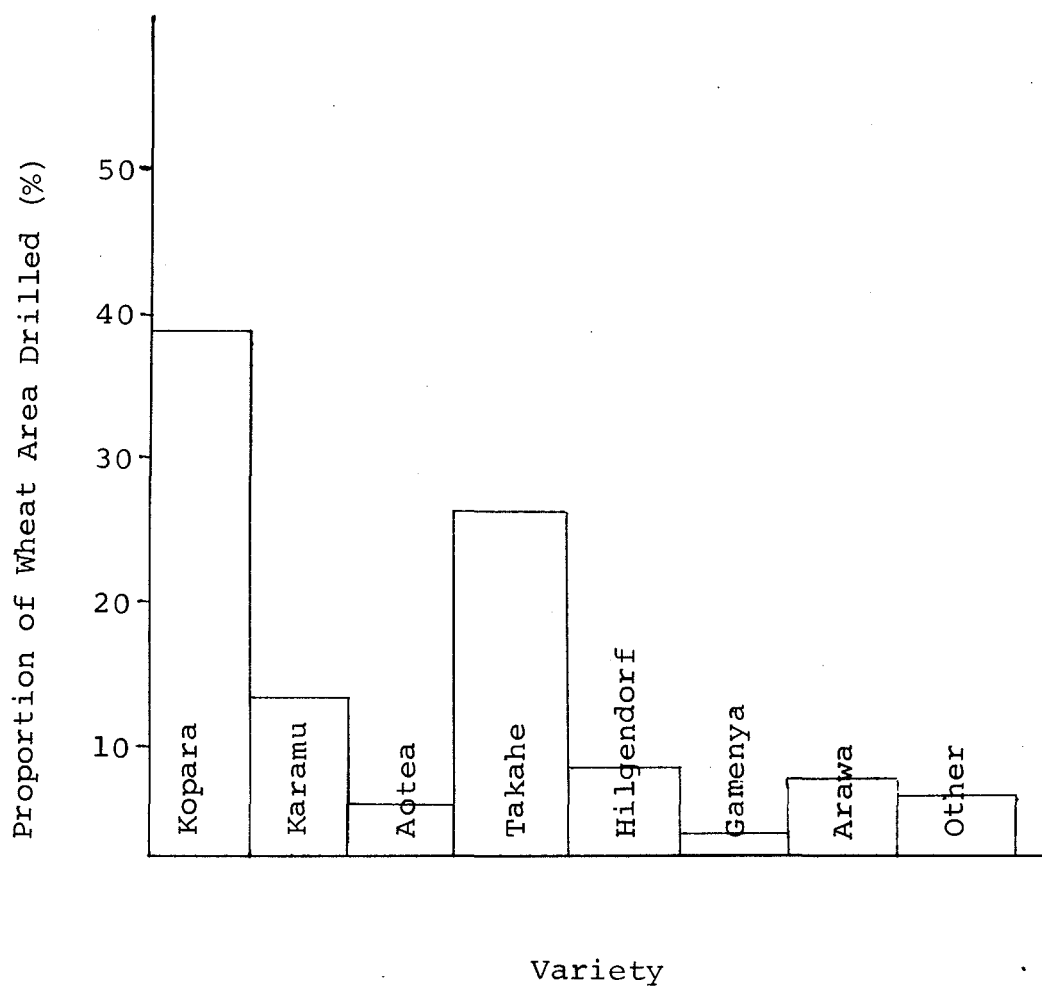


TABLE 18

Wheat Area and Yield by Variety, 1979-80

26.

	No. of Farms Which Drilled Variety	Area Drilled (ha)	Av. Yield (tonnes/ ha)	No. of Farms Which Drilled Variety	Area Drilled (ha)	Av. Yield (tonnes/ ha)
	North Island			Canterbury		
Karamu	11	22.62	4.32	12	2.92	4.27
Kopara				35	15.28	3.37
Aotea				5	0.58	3.20
Gamenya				2	0.40	3.06
Oroua				4	0.53	3.41
Rongotea				3	0.32	2.61
Takahe						
Arawa				9	4.02	3.90
Hilgendorf				16	4.78	2.96
Other				6	0.84	3.36
Total	15	26.54	4.23	92	29.80	3.44
	South Canterbury			Southland		
Karamu	4	8.55	2.65			
Kopara	18	17.36	2.95	15	3.63	4.24
Aotea				5	1.13	3.57
Gamenya						
Oroua						
Rongotea						
Takahe	6	3.18	2.89	41	16.62	4.49
Arawa						
Hilgendorf				2	0.24	4.15
Other	2	0.68	1.84			
Total	38	33.16	2.84	63	21.61	4.40
	All Regions Average					
Karamu	27	4.15	3.58			
Kopara	69	11.27	3.34			
Aotea	11	0.88	3.18			
Gamenya	4	0.28	2.65			
Oroua	6	0.28	3.65			
Rongotea	5	0.25	3.14			
Takahe	48	6.04	4.29			
Arawa	10	1.76	3.88			
Hilgendorf	20	2.22	2.93			
Other	10	0.59	3.14			
Total	210	27.72	3.74			

CHAPTER 4

MANAGEMENT PRACTICES AND MACHINERY DETAILS

Some of the management practices employed on survey farms which grew wheat in 1979-80, along with farm machinery details, are summarised in this chapter.

4.1 Management Practices

Average sowing and harvesting dates varied considerably between regions (Table 19). For the North Island and Southland properties wheat is almost exclusively a spring sown crop, whereas the majority of Canterbury and South Canterbury crops are autumn sown. Compared with 1978-79, drilling dates for Canterbury were 8 days earlier, South Canterbury 3 days earlier, North Island 25 days later and Southland 4 days later. The harvest in all areas, except the North Island, was earlier than in the preceding year. In Canterbury it was 2 days earlier, South Canterbury 17 days and Southland 7 days.

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

TABLE 19
Drilling and Harvesting Dates, 1979-80

	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms Which Har- vested Wheat	(13)	(59)	(28)	(49)	(149)
<u>Drilling Date,</u> <u>1979</u>					
Average	Oct 19	Jul 7	Jul 24	Sep 25	Aug 10
Std Dev. ^a (days)	19	35	41	47	
<u>Harvesting</u> <u>Date, 1980</u>					
Average	Mar 1	Feb 5	Feb 17	Mar 29	Feb 25
Std Dev. ^a (days)	18	12	15	25	

^a The standard deviation gives an idea of the range of individual farm drilling dates involved in calculating the average. For a normal distribution 65 per cent of the individual values lie within plus or minus 1 standard deviation of the average, and 96 per cent lie within plus or minus 2 standard deviations.

TABLE 20
Drilling Rates, 1979-80

	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms Which Drilled Wheat	(14)	(60)	(28)	(52)	(154)
<u>Drilling Rate</u> <u>(kg/ha)</u>					
Average	178	130	137	180	150

Table 21 lists a number of management practices which were involved in growing and harvesting the wheat crop and the proportion of survey farms that 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 crop may have had nitrogenous fertiliser top-dressed.

Few major differences in management practices were observed between this survey and the previous one (1978-79). Seasonal conditions caused an increase in the use of fungicides and maintained the relatively high levels of nitrogen application and grain drying.

TABLE 21

Management Practices, 1979-80

	Proportion of Farms (%)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	(13)	(59)	(28)	(49)	(149)
<u>Management Practice</u>					
Wheat Crop Undersown with Clover	0	12	18	2	9
Fertiliser Applied at Drilling	100	90	86	100	93
Nitrogenous Fertiliser Applied at Drilling	77	24	39	71	45
Nitrogenous Fertiliser Topdressed	15	46	25	18	31
Weedicide Used	100	73	82	90	82
Insecticide Used	31	5	4	0	4
Fungicide Used	15	8	7	45	20
Wheat Irrigated	0	5	0	0	2
Grain Dried	23	8	36	80	38

4.2 Machinery Details

Tractor running costs involved in cultivation and drilling and the associated labour costs form a substantial proportion of total establishment costs (Table 43); therefore average tractor hours for cultivation and drilling are presented in Table 22.

For the "all regions" survey farm that drilled wheat, the time spent in cultivation (3.63 hours per hectare) was similar to the previous year (3.62 hours per hectare). Drilling times (0.86 hours per hectare) were less than the previous year (0.94 hours per hectare).

TABLE 22
Tractor Hours for
Wheat Cultivation and Drilling^a,
1979-80

	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Drilled Wheat	(14)	(60)	(28)	(52)	(154)
Tractor Cultivation Time (hrs/ha)	3.37	3.51	3.84	3.70	3.63
Tractor Drilling Time (hrs/ha)	0.95	0.79	0.86	0.94	0.86

^a Farms which used contractors are excluded.

Information relating to tractor usage, repair costs and value is shown in Table 23. Nearly one third of all tractors were less than 60 horsepower, 50 per cent were 61-85 horsepower and 18 per cent were over 85 horsepower. These large tractors have increased by 4 per cent relative to the 1978-79 survey figures. Of the total hours² worked by all tractors, the 61-85 horsepower tractors contributed 55 per cent, the less than 60 horsepower contributed 24 per cent and the greater than 85 horsepower contributed 21 per cent. The total hours worked by these large tractors has increased 5 per cent relative to the 1978-79 survey figures.

Table 24 shows repair costs increased with both the age and horsepower of tractor. The breakdown of these repair costs by age, shows engine repairs to be higher in tractors greater than 5 years old while transmission and hydraulic repairs were greatest in tractors over 10 years of age. The analysis of these costs by horsepower, suggest that engine repairs were greatest in tractors over 60 horsepower while transmission and hydraulic repairs were greatest in tractors above 85 horsepower.

2

Total hours = Number of Tractors x Hours per Tractor

TABLE 23

Tractor Usage, Repair Costs and Value, 1979-80

Tractor Horsepower	Less than 60 h.p.			61-85 h.p.			Above 85 h.p.	
	0-5	6-10	11+	0-5	6-10	11+	0-5	6-10
Age of Tractor (yrs)								
Number of Tractors	14	22	49	74	44	12	39	8
Annual Usage ^a (Hours/Tractor)	447	349	239	455	450	383	466	421
Annual Repair Cost (\$/Tractor)	140	172	200	120	407	684	395	438
Repair Cost (\$/hour)	0.31	0.49	0.84	0.26	0.90	1.78	0.85	1.04
Value of Tractors at Cost Price (\$)	8,233	4,234	2,429	13,980	5,712	3,837	21,965	14,685

^a For all tractors the annual usage was 402 hours per tractor

TABLE 24

Tractor Repair Cost Details, 1979-80

<u>\$ /Hour Irrespective of H.P.</u>	<u>Type of Repair</u>			<u>Total</u> (\$ 'hr)
	<u>Engine</u> (\$ /hr)	<u>Transmission, Hydraulics</u> (\$ /hr)	<u>General, Tyres</u> (\$ /hr)	
0-5 years	0.18	0.11	0.16	0.45
6-10 years	0.33	0.18	0.30	0.81
Above 10 years	0.35	0.37	0.39	1.11
<u>\$ /Hour Irrespective of Age</u>				
Less than 60 h.p.	0.17	0.23 ^a	0.20	0.60
61-85 h.p.	0.27	0.11	0.22	0.60
Above 85 h.p.	0.27	0.28	0.32	0.87

^a The majority of tractors in this horsepower range was greater than 10 years old.

As for the 1978-79 survey, Table 25 indicates a large proportion of Canterbury and South Canterbury wheat-growers used their own header to harvest their wheat crops, while North Island and Southland farmers favoured the use of contract harvesting. On average, 62 per cent of farms used only their own header, 32 per cent used only a contractor, 3 per cent used both their own header and a contractor and 2 per cent sold their wheat standing.

TABLE 25

Harvesting Method, 1979-80

	Proportion of Farms (%)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	(13)	(59)	(28)	(49)	(149)
Own Header	23	76	79	39	62
Contractor	77	19	18	51	32
Own Header and Contractor	0	5	4	0	3
Sold Standing	0	0	0	6	2

CHAPTER 5

COSTS AND RETURNS

5.1 Selected Costs and Returns

Table 26 reports costs and returns on a per hectare wheat harvested basis while Table 27 lists the results on a per tonne harvested basis. Gross revenue from wheat growing was 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.

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 wheat costs up to and including harvesting and any on-farm cartage of wheat. In addition, an estimate of off-farm cartage costs were made, and overhead costs relating to farm machinery used on wheat were calculated.

For the purpose of tabulating results the selected 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.

Total variable costs are subtracted from gross revenue to give a gross margin estimate from which machinery overheads are then subtracted.³ Land is assumed to be a fixed cost and so no rental figure has been imputed. Statistical information relating to the reliability of these costs and returns is given in Appendix B.

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 lower machinery inputs will become relatively more attractive. The allocation of machinery overhead costs has been undertaken so that the significance of this aspect of wheat growing may be assessed.

In calculating the overhead costs, depreciation and average book values have been determined on a "current cost" basis as well as by the traditional "historical cost" method.⁴ 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 original position as at the start of the year. This is achieved by taking account of inflation in machinery prices. Book values

³ Gross margin minus machinery overheads is interpreted as a return to land, capital, management and other overheads (excluding machinery).

⁴ See Appendix C, Tables 46 and 47

arrived at by the "current cost" method more closely approximate market values than book values derived by applying the "historical cost" method.

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 would 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 because enterprises not undertaking new investment do not gain from such allowances.

Tables 28 and 29 indicate the importance of various sources of revenue on a per hectare and per tonne basis respectively. Of wheat not sold to the Wheat Board, the most important source of revenue was sale as stock feed followed by sale or own use as seed.

TABLE 26
Wheat Costs and Returns per Hectare, 1979-80

Number of Survey Farms which Harvested Wheat	Average Cost (Return) (\$/ha)				
	North Island (13)	Canterbury (59)	South Canterbury (28)	Southland (49)	All Regions (149)
1 Establishment Costs	123.35	69.39	76.06	110.04	86.50
2 Growing Costs	30.91	33.99	27.37	29.22	30.92
3 Harvesting Costs	80.99	25.48	27.99	95.13	51.07
4 Cartage Costs	29.93	18.47	13.66	24.74	20.04
5 Total Variable Costs ^a (1+2+3+4)	265.18	147.33	145.08	259.13	188.53
6 Machinery Overhead Costs (Historical Cost Basis)	44.04	66.10	85.67	119.53	86.21
7 Machinery Overhead Costs (Current Cost Basis)	67.93	105.08	143.22	180.92	135.50
8 Total Selected Costs (5+6)	309.22	213.43	230.75	378.66	274.74
9 Total Selected Costs (5+7)	333.11	252.41	288.30	440.05	324.03
10 Gross Revenue	500.63	486.98	400.01	613.17	509.78
11 Gross Margin (10-5)	235.45	339.66	254.93	354.04	321.25
12 Gross Margin minus Machinery Overhead Costs (11-6)	191.41	273.55	169.26	234.57	235.04
13 Gross Margin minus Machinery Overhead Costs (11-7)	167.52	234.57	111.71	173.12	185.75

^a The cost of farm labour involved in tractor work, drilling and harvesting is included. Tractor repairs and machinery insurance are included under machinery overhead costs.

TABLE 27
Wheat Costs and Returns per Tonne, 1979-80

Number of Survey Farms Which Harvested Wheat	Average Cost (Return) per tonne Harvested (\$/t)				
	North Island (13)	Canterbury (59)	South Canterbury (28)	Southland (49)	All Regions (149)
1 Establishment Costs	31.97	20.73	27.71	23.47	23.64
2 Growing Costs	7.19	9.43	10.02	6.21	8.41
3 Harvesting Costs	20.66	7.70	10.70	20.39	13.04
4 Cartage Costs	7.96	5.35	4.74	5.86	5.52
5 Total Variable Costs ^a (1+2+3+4)	67.78	43.21	53.17	55.93	50.61
6 Machinery Overhead Costs (Historical Cost Basis)	13.75	19.89	33.83	24.85	24.10
7 Machinery Overhead Costs (Current Cost Basis)	21.93	31.74	57.13	37.44	38.40
8 Total Selected Costs (5+6)	81.53	63.10	87.00	80.78	74.71
9 Total Selected Costs (5+7)	89.71	74.96	110.30	93.37	89.01
10 Gross Revenue	118.41	140.96	137.28	130.03	135.56
11 Gross Margin	50.63	97.75	84.11	74.10	84.95
12 Gross Margin minus Machinery Overhead Costs (11-6)	36.88	77.86	50.28	49.25	60.85
13 Gross Margin minus Machinery Overhead Costs (11-7)	28.70	66.00	26.98	36.66	46.55

^a The cost of farm labour involved in tractor work, drilling and harvesting is included. Tractor repairs and machinery insurance are included under machinery overhead costs.

TABLE 28

Sources of Wheat Gross Revenue
per Hectare, 1979-80

	Average Gross Revenue (\$/ha)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	(13)	(59)	(28)	(49)	(149)
<u>Source of Revenue</u>					
1. Wheat Board	252.53	394.28	373.69	509.96	419.89
2. Stock Feed	212.34	75.65	23.60	10.71	50.77
3. Seed	35.76	17.02	2.72	56.20	27.49
4. Sold Standing	0.00	0.00	0.00	36.23	11.59
5. Insurance Claim	0.00	0.03	0.01	0.07	0.04
Total Revenue	500.63	486.98	400.01	613.17	509.78

TABLE 29

Sources of Wheat Gross Revenue per Tonne, 1979-80

	Average Gross Revenue (\$/t)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	(13)	(59)	(28)	(49)	(149)
<u>Source of Revenue</u>					
1. Wheat Board	51.64	115.02	128.88	110.20	113.22
2. Stock Feed	60.57	21.33	7.51	2.33	14.31
3. Seed	6.20	4.59	0.89	10.52	5.79
4. Sold Standing	0.00	0.00	0.00	6.97	2.23
5. Insurance Claim	0.00	0.02	0.00	0.01	0.01
Total Revenue	118.41	140.96	137.28	130.03	135.56

5.2 Variation in Returns

Tables 30,31,32 show the variation in different measures of return. Fifty to sixty per cent of all farms which harvested wheat had a gross revenue per hectare of \$300-550, a gross margin per hectare of \$150-350 and a gross margin less machinery overhead costs (current) per hectare of \$100-300. In Southland 55-60 per cent of wheat producing farms had a gross revenue per hectare in excess of \$600, a gross margin of \$300-500 per hectare and a gross margin less machinery overhead costs (current) of \$200-400 per hectare.

TABLE 30
Distribution of Gross Revenue, 1979-80

	Proportion of Farms (%)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	(13)	(59)	(28)	(49)	(149)
<u>Gross Revenue</u> (\$/ha)					
Below 200	0.0	0.0	0.0	4.1	1.3
200 - 250	7.7	1.7	7.2	0.0	2.6
250 - 300	7.7	0.0	10.7	0.0	2.6
300 - 350	0.0	15.3	14.2	0.0	3.4
350 - 400	7.7	20.3	32.1	0.0	12.8
400 - 450	15.4	18.6	14.3	2.0	12.8
450 - 500	7.7	20.3	7.2	10.2	12.8
500 - 550	7.7	8.5	3.5	12.2	13.4
550 - 600	23.0	10.2	0.0	16.3	10.7
600 - 650	0.0	0.0	7.2	10.2	8.7
650 - 700	15.4	3.4	0.0	10.2	4.7
700 and above	7.7	0.0	3.6	34.8	14.2
Total	100.0	100.0	100.0	100.0	100.0

TABLE 31
Distribution of Gross Margin, 1979-80

	Proportion of Farms (%)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	(13)	(59)	(28)	(49)	(149)
<u>Gross Margin</u> (\$/ha)					
Below 0	7.7	0.0	0.0	4.0	2.0
0 - 50	7.7	0.0	0.0	0.0	0.7
50 - 100	0.0	0.0	7.2	0.0	1.4
100 - 150	15.5	6.8	10.8	2.0	6.7
150 - 200	0.0	3.4	21.4	0.0	5.4
200 - 250	23.0	6.8	14.2	10.0	10.7
250 - 300	23.0	15.3	17.8	16.0	16.8
300 - 350	0.0	27.1	17.8	16.0	18.7
350 - 400	7.7	15.3	0.0	14.0	11.4
400 - 450	7.7	18.5	0.0	20.0	14.7
450 - 500	7.7	3.4	7.2	8.0	6.0
500 - 550	0.0	0.0	0.0	2.0	0.7
550 - 600	0.0	1.7	0.0	2.0	1.4
600 and above	0.0	1.7	3.6	6.0	3.4
Total	100.0	100.0	100.0	100.0	100.0

TABLE 32

Distribution of Gross Margin less Machinery
Overhead Costs (Current), 1979-80

	Proportion of Farms (%)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	(13)	(59)	(28)	(49)	(149)
<u>\$/ha</u>					
Below 0	23.0	1.7	14.5	16.3	10.7
0 - 50	0.0	3.4	10.7	6.1	5.4
50 - 100	7.7	5.1	14.5	2.0	6.0
100 - 150	15.4	15.3	26.6	4.0	10.1
150 - 200	15.4	22.0	14.5	14.3	14.8
200 - 250	7.7	25.5	3.8	10.3	13.4
250 - 300	7.7	11.7	3.8	24.5	19.5
300 - 350	7.7	5.1	0.0	10.3	8.1
350 - 400	0.0	1.7	3.8	12.2	7.4
400 - 450	15.4	3.4	0.0	0.0	2.0
450 - 500	0.0	0.0	3.8	0.0	2.0
500 - 550	0.0	0.0	3.8	0.0	0.6
550 - 600	0.0	0.0	0.0	0.0	0.0
600 - 650	0.0	0.0	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0

5.3 Wheat Profitability Relative to Livestock

This section compares livestock farming with two measures of return from wheat growing. Table 33 shows that at \$15 per stock unit only 16 per cent of all survey wheat-growing farms had a higher gross margin from livestock than from wheat, compared with 25 per cent in 1978-79. Table 34 indicates that at \$15 per stock unit, if machinery overhead costs are allowed for, then 33 per cent of all survey wheat-growing farms would have a higher return from livestock than from wheat, compared with 43 per cent in 1978-79.

TABLE 33
Livestock Versus Wheat Gross Margins, 1979-80

	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	(13)	(59)	(28)	(49)	(149)
Wheat Gross Margin (\$/ha)	235.45	339.66	254.95	354.04	321.25
Spring Grazing Stocking Rate (S.U./ha)	14.80	13.10	11.18	14.11	13.11
Livestock Gross Margin at \$15 per S.U. (\$/ha)	22.00	196.50	167.76	211.65	196.65
Farms with Live- stock Gross Margin more than Wheat ^a	41.0	9.9	25.3	8.2	15.8
Gross Margin ^a (%)	(53.9)	(20.7)	(46.1)	(26.2)	(30.2)

^a Figures in () assume a livestock gross margin of \$20 per stock unit.

TABLE 34

Livestock Versus Wheat Gross Margins Less
Machinery Overhead Costs (Current), 1979-80

	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	(13)	(59)	(28)	(49)	(149)
Adjusted Wheat Gross Margin ^a (\$/ha)	167.52	234.57	111.71	173.12	185.75
Spring Grazing Stocking Rate (S.U./ha)	14.80	13.10	11.18	14.11	13.11
Adjusted Live- stock Gross Margin at \$15 per S.U. ^b (\$/ha)	173.46	153.53	131.03	165.36	153.65
Farms with Adjust- ed Livestock Gross Margin greater than adjusted Wheat ^c Gross Margin (%)	53.3 (68.8)	27.1 (57.2)	56.2 (77.0)	32.8 (50.0)	33.3 (52.1)

^a Machinery Overhead Costs (Current) subtracted.

^b \$15 per stock unit less opportunity cost of livestock estimated at 13.1 per cent of \$25 per stock unit.

^c Figures in () assume a livestock gross margin of \$20 per stock unit less opportunity cost of livestock estimated at 13.1 per cent of \$25 per stock unit.

CHAPTER 6

TRENDS IN PRODUCTION, COSTS AND RETURNS

6.1 Wheat Areas

Table 35 compares wheat areas drilled on all survey farms for the 1977-78, 1978-79 and 1979-80 surveys, and lists wheat area intentions for the 1980-81 crop year. These wheat area intentions are what survey farmers were intending to drill at the completion of harvesting in 1980.

TABLE 35
Wheat Areas Drilled and
Wheat Area Intentions

	Wheat Area (ha)			
	1977-78 Survey	1978-79 Survey	1979-80 Survey	1980-81 Intentions ^a
North Island	22.6	16.9	21.6	14.0
Canterbury	28.0	22.4	23.1	24.0
South Canterbury	19.5	21.4	29.0	22.6
Southland	13.1	16.9	20.8	17.9
All Regions	21.3	20.2	23.5	20.9

^a Recorded after harvest on the 1979-80 survey farms

6.2 Production and Selected Costs

Table 36 shows that in 1979-80, relative to 1976-77, wheat area harvested remained constant and the total area in cash crop increased by 9.3 per cent. Wheat yields have dropped by 7.5 per cent but an increase in the basic wheat price has offset this since gross revenue has increased by 27.5 per cent. Variable costs have increased by 44.1 per cent while the gross margin has risen by 17.9 per cent. However, machinery overheads have increased by 130.2 per cent, resulting in a 13.0 per cent drop in gross margin less machinery overhead costs.

Table 37 compares the different components of selected costs and an attempt is made to forecast the next annual change in these costs. These costs increased from \$225 to \$340 over the period of 1977-78 to 1979-80. This is a 51.1 per cent increase and costs are expected to increase a further 18 per cent over the period 1979-80 to 1980-81.

TABLE 36

Movement in Wheat Production, Costs and Returns

	1976-77	1979-80	Index for 1979-80 (1976-77=100)
<u>Production</u>			
Wheat Area Harvested (ha)	22.5	22.5	100.0
Total Cash Crop Area Harvested (ha)	51.7	56.5	109.3
Total Stock Units	1926	1823	94.7
Wheat Yield (t/ha)	3.89	3.60	92.5
<u>Costs & Returns</u> (\$/ha)			
Establishment Costs	60.32	86.50	143.4
Growing Costs	16.56	30.92	186.7
Harvesting Costs	37.32	51.07	136.8
Cartage Costs	13.12	20.04	152.7
Total Variable Costs	127.32	188.53	144.1
Gross Revenue	399.79	509.78	127.5
Gross Margin	272.47	321.25	117.9
Machinery Overhead Costs (Current)	58.87	135.50	230.2
Gross Margin Less Machinery Overhead Costs (Current)	213.60	185.75	87.0

TABLE 37
Trends in Selected Costs

	1977-78	1978-79	1979-80	1980-81 ^a	Change ^a 1979-80 to 1980-81
<u>Establishment Costs</u>	\$/ha	\$/ha	\$/ha	\$/ha	%
Cultivation	12.94	11.95	14.11	26.64	+89
Labour	13.93	14.50	17.34	18.90	+ 9
Seed	28.69	33.73	35.48	43.28	+22
Fertiliser	15.75	15.16	19.55	28.73	+47
Total	71.74	75.36	86.48	117.55	+36
<u>Growing Costs</u>					
Harrowing & Rolling	0.36	0.14	0.19	0.34	+78
Fertiliser	4.87	9.50	9.03	13.27	+47
Spraying	13.71	16.08	21.52	23.75	+10
Irrigation	1.13	0.57	0.18	0.32	+78
Total	20.06	26.28	30.92	37.68	+22
<u>Harvesting Costs</u>					
Desiccation	0.10	0.13	0.49	0.11	-77
Machinery & Contractor	20.92	22.42	26.15	31.38	+20
Labour	4.22	5.19	5.93	6.46	+ 9
Bags	0.47	0.55	0.65	0.69	+ 6
Grain Drying	4.93	11.42	14.66	13.78	- 6
Insurance	1.97	2.73	3.21	3.53	+10
Total	32.62	42.42	51.07	55.95	+21
Cartage Costs	12.69	14.13	20.04	25.56	+28
Total Variable Costs	137.11	158.19	188.53	236.74	+26
<u>Machinery Overhead Costs (Current)</u>					
Repairs & Maintenance	11.81	17.18	13.82	16.58	+20
Depreciation	50.27	55.99	69.20	74.73	+ 8
Interest on Book Value	26.13	36.02	52.48	57.20	+ 9
Total	88.21	109.19	135.50	148.51	+10
Total Selected Costs	225.32	267.38	324.03	385.25	+18

^a Estimates based on assumptions given in Appendix D.

6.3 Returns

Table 38 standardises yearly revenues with respect to varying wheat yields. This is done by calculating revenues based on a constant yield, that is, the average yield over the period 1976-77 to 1979-80. An attempt is also made to estimate the 1980-81 wheat revenue.

The table shows that over the three year period 1977-78 to 1979-80 the basic wheat price increased by 16 per cent to \$140. Similarly the adjusted gross margin increased by 8 per cent to \$321. This indicates the increase in the basic wheat price covered the increases in total variable costs. The adjusted gross margin per hectare less machinery overhead costs declined during the three year period, indicating the increases in the basic wheat price did not offset increases in machinery overhead costs.

It is estimated for the 1980-81 season that, relative to the 1979-80 season, total variable costs will increase by 26 per cent to \$235.79 and machinery overhead costs by 13 per cent to \$148.51. Given these cost increases and a basic wheat price of \$167 per tonne, it is estimated that the gross margin less machinery overhead costs for 1980-81 will be \$218 per hectare.

TABLE 38
Trends in Prices and Revenue

	1977-78	1978-79	1979-80	1980-81 ^c
Basic Wheat Price (\$/t)	120.00	127.50	140.00	167.00 ^d
Actual Price ^a (\$/t)	117.02	125.59	135.56	163.00
Actual Price (% Basic Price)	97.5	98.5	96.5	97.6
Adjusted Revenue ^b (\$/ha)	435.31	467.19	509.78	601.47
Total Variable Costs	137.11	158.19	183.53	236.74
Adjusted Gross Margin (\$/ha)	298.09	309.00	321.25	364.73
Machinery Overhead Costs (Current) (\$/ha)	88.21	109.19	135.50	148.51
Adjusted Gross Margin less Machinery Overhead Costs (\$/ha)	209.99	199.81	185.75	216.22

^a Actual price received per tonne by growers taking into account variety premiums and discounts.

^b Basic price times constant yield. The yield was the "All Regions" average yield 1976-77 to 1979-80 i.e. 3.69 t/ha.

^c Estimate based on cost assumptions given in Appendix D.

^d Guaranteed minimum for 1980-81 season.

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APPENDIX A

REGIONAL CLIMATIC DATA

TABLE 39

Weather Indices for North and Central Canterbury
Wheat Growing Areas,^a 1979-80

Month	Rainfall	Average Temperature	Soil Moisture Deficit	Sunshine
	Percent of normal ^c	Deviation from normal ^c (°C)	Days ^b	Percent of normal ^c
March	270	+0.2	4.9	49
April	19	+0.2	-	121
May	148	-0.4	-	87
June	26	+1.0	-	110
July	130	+1.4	-	100
August	194	-0.5	-	72
September	51	+0.6	-	81
October	208	-0.4	-	78
November	92	+0.6	-	89
December	81	+0.9	3.4	116
January	181	+0.1	3.2	91
February	91	-0.9	10.5	85
March	228	-0.9	-	83
April	141	+0.1	-	80

^a Weighted by county wheat areas in 1967-68

^b The number of "days of deficit" is calculated from daily rainfall data by assuming that evapotranspiration continues at the Thornthwaite potential evapotranspiration rate until 75 mm of soil moisture have been withdrawn. Thereafter, days of deficit are counted until there is a day with rainfall in excess of the daily potential evapotranspiration.

^c 1941-70

Source: Maunder, W.J., N.Z. Meteorological Service, pers. comm., 1980.

TABLE 40

Weather Indices for Mid and South Canterbury
Wheat Growing Area,^a 1979-80

Month	Rainfall	Average Temperature	Soil Moisture Deficit	Sunshine
	Percent ^c of normal ^c	Deviation from normal ^c (°C)	Days ^b	Percent ^c of normal ^c
March	190	-0.2	3.4	53
April	27	+0.1	1.2	119
May	229	-0.4	0.4	90
June	28	+1.0	-	105
July	99	-1.6	-	106
August	147	-0.7	-	83
September	54	+0.3	-	87
October	194	-0.5	-	84
November	85	+0.8	-	97
December	80	+0.3	3.7	117
January	155	+0.3	6.1	96
February	76	0.0	12.5	94
March	176	-0.7	1.2	90
April	233	-1.0	0.6	93

^a Weighted by county wheat areas in 1967-68

^b The number of "days of deficit" is calculated from daily rainfall data by assuming that evapotranspiration continues at the Thornthwaite potential evapotranspiration rate until 75 mm of soil moisture have been withdrawn. Thereafter, days of deficit are counted until there is a day with rainfall in excess of the daily potential evapotranspiration.

^c 1941-70

Source: Maunder, W.J., N.Z. Meteorological Service, pers. comm., 1980

TABLE 41
 Weather Indices for the Southland
 Wheat Growing Area,^a 1979-80

Month	Rainfall	Average Temperature	Soil Moisture Deficit	Sunshine
	Percent ^c of normal ^c	Deviation from normal ^c (°C)	Days ^b	Percent ^c of normal ^c
March	64	0.0	-	78
April	132	+0.7	-	115
May	147	-0.3	-	69
June	75	+1.0	-	96
July	103	+1.7	-	101
August	92	-1.0	-	84
September	138	+0.1	-	92
October	79	-0.1	-	90
November	57	-1.3	-	103
December	117	+0.1	-	97
January	209	0.0	-	88
February	86	-0.4	-	95
March	113	-0.5	-	90
April	38	+0.3	-	90

^a Weighted by county wheat areas in 1967-68

^b The number of "days of deficit" is calculated from daily rainfall data by assuming that evapotranspiration continues at the Thornthwaite potential evapotranspiration rate until 75 mm of soil moisture have been withdrawn. Thereafter, days of deficit are counted until there is a day of rainfall in excess of the daily potential evapotranspiration.

^c 1941-70

Source: Maunder, W.J., N.Z. Meteorological Service,
 pers. comm., 1980.

APPENDIX B

RELIABILITY OF SURVEY ESTIMATES

Due to sampling error, estimates of farm characteristics based on a sample of farms, are likely to differ from figures which would have been obtained had information been collected from all farms in the population. However, since the sample was selected probabilistically, sampling theory can be used to compute this sampling error. A summary measure that captures this error is the relative standard error (R.S.E.) defined as the standard deviation of the estimate divided by the estimated mean. The smaller the R.S.E., the more reliable the estimate.

Table 42 reports the mean and R.S.E. of the important cost and revenue items. For example, the table shows the "all regions" average survey farm having a gross margin of \$321.26 per hectare, with a R.S.E. of 5.96 per cent. In other words one can be 95 per cent certain that the true value of the "all regions" average mean gross margin per hectare lies within the range $1.96 \times 5.96 \text{ per cent} \times \321.26 either side of the estimated mean. That is, within $\$321.26 \pm \37.53 . The North Island figures should be interpreted with caution due to the small sample size.

TABLE 42

RELIABILITY OF SUMMARY WHEAT COSTS AND RETURNS, 1979-80

Number of Survey Farms which Harvested Wheat	North Island (13)	Canterbury (59)	South Canterbury (28)	Southland (49)	All Regions (149)
Establishment Costs					
- Mean (\$/ha)	123.35	69.39	76.07	110.04	86.50
- R.S.E. (%)	5.57	3.35	4.41	3.26	3.66
Growing Costs					
- Mean (\$/ha)	30.91	33.99	27.37	29.22	30.92
- R.S.E. (%)	13.37	13.77	14.53	10.17	12.76
Harvesting Costs					
- Mean (\$/ha)	80.99	25.48	27.99	95.13	51.07
- R.S.E. (%)	9.41	10.29	15.61	8.60	10.82
Cartage Costs					
- Mean (\$/ha)	29.93	18.47	13.66	24.74	20.04
- R.S.E. (%)	10.68	5.02	7.48	9.25	7.17
Total Variable Costs					
- Mean (\$/ha)	265.17	147.33	145.08	259.13	188.52
- R.S.E. (%)	5.56	4.24	4.83	3.74	4.27
Machinery Overhead Costs (Historical)					
- Mean (\$/ha)	44.04	66.10	85.67	119.53	86.21
- R.S.E. (%)	23.13	8.80	14.38	13.06	12.05
Machinery Overhead Costs (Current)					
- Mean (\$/ha)	67.93	105.08	145.22	180.92	135.50
- R.S.E. (%)	22.33	7.27	14.00	12.79	11.20
Total Selected Costs (Historical)					
- Mean (\$/ha)	309.22	213.43	230.75	378.65	274.73
- R.S.E. (%)	4.84	3.91	5.68	4.96	4.66
Total Selected Costs (Current)					
- Mean (\$/ha)	333.10	252.41	288.30	440.05	324.02
- R.S.E. (%)	5.11	3.92	6.90	5.81	5.21
Gross Revenue					
- Mean (\$/ha)	500.63	486.98	400.01	613.17	509.78
- R.S.E. (%)	8.36	2.63	5.38	3.97	3.92
Gross Margin					
- Mean (\$/ha)	235.45	339.66	254.93	354.05	321.26
- R.S.E. (%)	15.74	3.45	8.66	5.94	5.96
Gross Margin Minus Machinery Overhead Costs (Historical)					
- Mean (\$/ha)	191.41	273.55	169.25	234.52	235.05
- R.S.E. (%)	22.72	4.55	16.12	9.46	9.46
Gross Margin Minus Machinery Overhead Costs (Current)					
- Mean (\$/ha)	167.53	234.58	111.71	173.12	185.76
- R.S.E. (%)	28.51	5.75	29.16	14.99	14.76

APPENDIX C

BREAKDOWN OF COST ITEMS

The breakdown of the summary costs and returns for the wheat crop, Table 26, is detailed in Tables 43 to 47. A description of the terms used in these tables is given in Appendix D.

TABLE 43
Establishment Costs,
1979-80

	Average Cost (\$/ha)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms Which Harvested Wheat	(13)	(59)	(28)	(49)	(149)
<u>Item</u>					
(a) Cultivation and Drilling					
- Tractor Running	10.39	12.90	14.12	13.08	13.08
(b) Cultivation and Drilling					
- Labour	14.72	16.65	18.55	17.85	17.34
(c) Cultivation					
- Contractor	4.74	0.00	0.00	1.32	0.66
(d) Drilling					
- Contractor	3.82	0.09	0.00	0.46	0.37
(e) Seed	53.61	28.69	30.05	41.00	34.16
(f) Seed Cartage	1.50	0.69	0.74	2.51	1.32
(g) Fertiliser	34.45	9.41	11.63	31.86	18.31
(h) Fertiliser Cartage	0.12	0.95	0.98	1.96	1.24
Total Establishment Costs	123.35	69.39	76.06	110.04	86.50

TABLE 44
Growing Costs, 1979-80

Number of Survey Farms Which Harvested Wheat	Average Cost (\$/ha)				
	North Island (13)	Canterbury (59)	South Canterbury (28)	Southland (49)	All Regions (149)
<u>Item</u>					
(a) Harrowing & Rolling - Tractor Running	0.10	0.10	0.03	0.08	0.08
(b) Harrowing & Rolling - Labour	0.12	0.15	0.03	0.11	0.11
(c) Fert. Topdressing - Tractor Running	0.00	0.16	0.10	0.09	0.12
(d) Fert. Topdressing - Labour	0.00	0.21	0.13	0.14	0.16
(e) Fert. Topdressing - Contractor Spreading	0.77	1.26	0.48	0.14	0.71
(f) Fertiliser	2.97	11.18	3.55	3.35	6.66
(g) Fertiliser Cartage	1.06	1.69	1.47	0.96	1.38
(h) Spraying Tractor Running	0.44	0.20	0.27	0.40	0.29
(i) Spraying-Labour	0.66	0.27	0.39	0.59	0.42
(j) Spraying-Contractor	7.44	3.27	5.57	4.01	4.20
(k) Weedicide-Material	14.65	13.74	14.30	13.80	13.92
(l) Insecticide- Material	1.64	0.64	0.16	0.00	0.38
(m) Fungicide - Material	1.05	0.70	0.89	5.54	2.31
(n) Irrigation- Running	0.00	0.15	0.00	0.00	0.06
(o) Irrigation- Tractor Running	0.00	0.11	0.00	0.00	0.05
(p) Irrigation- Labour	0.00	0.16	0.00	0.00	0.07
Total Growing Costs	30.91	33.99	27.37	29.22	30.92

TABLE 45
Harvesting Costs, 1979-80

Number of Survey Farms Which Harvested Wheat	Average Cost (\$/ha)				
	North Island (13)	Canterbury (59)	South Canterbury (28)	Southland (49)	All Regions (149)
<u>Item</u>					
(a) Desiccation - Material	0.00	0.16	0.00	0.67	0.28
(b) Desiccation - Tractor Running	0.00	0.00	0.00	0.00	0.00
(c) Desiccation-Contract - Application	0.00	0.06	0.00	0.58	0.21
(d) Header-Fuel	0.83	2.49	2.54	1.52	2.11
(e) Header-Tractor Running	0.00	0.28	0.00	0.07	0.14
(f) Harvesting-Labour	2.27	6.61	7.52	4.58	5.93
(g) Harvesting - Contractor	61.33	10.44	10.38	39.33	22.22
(h) Paddock to Silo - Truck Fuel	0.47	0.22	0.38	1.13	0.56
(i) Paddock to Silo - Tractor	0.11	0.22	0.09	0.10	0.15
(j) Paddock to Silo - Truck Hire	2.86	0.03	0.10	2.48	0.97
(k) Bags (net)	1.78	0.23	0.67	1.00	0.65
(l) Grain Drying - Own	0.00	0.52	0.89	3.04	1.38
(m) Grain Drying - Contractor	9.09	0.43	2.39	37.94	13.28
(n) Crop Insurance	2.25	3.18	3.04	2.69	3.21
Total Harvesting Costs	80.99	25.48	27.99	95.13	51.07

TABLE 46
 Machinery Overhead Costs
 (Historical), 1979-80

Number of Survey Farms Which Harvested Wheat	Average Cost (\$/ha)				
	North Island (13)	Canterbury (59)	South Canterbury (28)	Southland (49)	All Regions (149)
<u>Item</u>					
(a) Repairs and Insurance	9.60	13.35	15.47	14.02	13.82
(b) Depreciation at 15% diminishing value (historical cost)	19.03	29.15	38.80	58.30	40.00
(c) Interest on Capital at 13.1% Book Value	15.41	23.60	31.41	47.20	32.39
Total Machinery Overhead Costs (Historical)	44.04	66.10	85.67	119.53	86.21

TABLE 47

Machinery Overhead Costs (Current), 1979-80

	Average Cost (\$/ha)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms Which Harvested Wheat	(13)	(59)	(28)	(49)	(149)
<u>Item</u>					
(a) Repairs and Insurance	9.60	13.35	15.47	14.02	13.82
(b) Depreciation at 15% diminishing value (current cost)	33.17	52.17	72.66	94.92	69.20
(c) Interest on Capital at 13.1% Book Value	25.16	39.58	55.10	71.98	52.48
Total Machinery Overhead Costs (Current)	67.93	105.08	143.22	180.92	135.50

APPENDIX D

DESCRIPTION OF COST ITEMS

1. Establishment Costs

(a) Cultivation and Drilling-Tractor running:

Tractor running costs for survey farms were estimated as follows:

For tractors 60 h.p. or less, running cost = \$2.37 per hour

For tractors 61-80 h.p., running costs = \$3.03 per hour

For tractors greater than 85 h.p., running
costs = \$3.70 per hour

These costs included diesel fuel costed at 25.0 cents per litre but excluded insurance, registration and any major repairs.

(b) Cultivation and Drilling - Labour:

Total labour time for cultivation and drilling was determined from the tractor hours and the number of people involved. This time was costed at \$3.80 per hour based on the average salary (\$6,704) of full time employees on survey farms, plus an allowance of \$35.62 per week for housing etc.

(c) Cultivation - Contractor:

The actual amount paid for any contract work was used.

(d) Drilling - Contractor:

The actual amount paid for any contract drilling was used.

(e) Seed:

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:

This 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:

This cost refers to the cost of fertiliser applied at drilling. The cost was determined as the "Works Price" minus any appropriate spreading or price subsidies. The only Government subsidy for spreading fertiliser applying at the time of the first visit (up to drilling) was \$2.00 per tonne for commercial aerial spreading.

(h) Fertiliser Cartage:

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

2. Growing Costs

(a) Harrowing and Rolling - Tractor Running:

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" under Establishment Costs 1 (a).

(b) Harrowing and Rolling - Labour:

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

(c) Fertiliser Topdressing - Tractor Running:
Tractor running costs for fertiliser topdressing were costed as described under Establishment Costs 1 (a).

(d) Fertiliser Topdressing - Labour:
Labour for topdressing fertiliser was costed as under Establishment Costs 1 (b).

(e) Fertiliser Topdressing - Contract Spreading:
The contract spreading cost is the actual amount paid by the farmer before deduction of spreading subsidy.

(f) Fertiliser:
This item refers to the cost of fertiliser top-dressed on to the growing crop. The amount was determined as in Establishment Costs 1 (g).

(g) Fertiliser Cartage:
Fertiliser cartage cost for fertiliser topdressed on to the growing crop was calculated as under Establishment Costs 1 (h).

(h) Spraying - Tractor Running:
Where spraying was carried out using a tractor, the tractor running costs were determined as for Establishment Costs 1 (a).

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

(j) Spraying - Contractor:
Amount paid for contract spraying of wheat crop.

(n) Irrigation - Running:
Where any irrigation plant used an electric, diesel or petrol motor, the estimated cost was included under this heading.

(o) Irrigation - Tractor Running:
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:

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

3. Harvesting Costs

(a) Header-Fuel:

This is the estimated fuel cost of harvesting where a grower used his own self-propelled header. Diesel = 25.0 c per litre. Petrol = 43.0 c per litre minus tax rebate.

(b) Header-Tractor Running:

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 \$3.80 per hour as outlined in Establishment Costs 1 (b).

(d) Harvesting-Contractor:

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:

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

(f) Paddock to Silo-Tractor Running:

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

(g) Paddock to Silo-Truck Hire:

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) Bag (net):

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-Own:

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

(j) Grain Drying-Contractor:

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

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 proportion is sold off-farm.

5. Total Variable Costs

This is the sum of Establishment Costs, Growing Costs, Harvesting Costs and Cartage Costs and includes certain farm labour associated with the wheat enterprise.

6. Machinery Overhead Costs

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
Equipment, Trucks, Drill,
Trailers, Grain Augers etc = $\frac{\text{area of wheat}}{\text{total area cultivated}} \times 100$
for the year.

(a) Repairs and Insurance:

This item includes repairs and maintenance on all machinery and equipment used on the wheat enterprise for the 1979-80 wheat crop year. Insurance at 0.45 per cent of tractor and header cost is also included.

(b) Depreciation:

Historical Cost

Depreciation was calculated by the diminishing value method (15 per cent 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 initial historical cost

Current Cost

The historical cost of machinery used on the wheat enterprise was inflated by a machinery price index⁵ and diminishing value depreciation (15 per cent) was then calculated from the updated cost.

Depreciation in year $n = \text{Cost}_0 \times \frac{I_n}{I_0} \times (0.85)^{n-1} \times 0.15$

Where Cost_0 = Initial historical cost

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

I_0 = Inflation index at the time of purchase
(year $n=0$)

(c) Interest on Capital:

Using the depreciation method outlined under (b), an average book value was determined both by the historical cost method and the current cost method for each item of plant and machinery used on wheat. Interest on capital was then imputed at 13.1 per cent. This is a weighted average of the average overdraft interest rates of Trading Banks applying to Agriculture at September 1979, and the normal interest rates being

⁵ Department of Statistics, Monthly Abstract of Statistics

charged by Stock and Station Agents at that time.

7. Cost estimates for 1980-81 are based on the following assumptions:

- (a) Diesel which was 82 per cent of total fuel costs, increased from 25.0 c per litre to 33.6 c per litre while oil increased from \$2.12 per litre to \$2.40 per litre. In addition half of the fuel price increases announced on 5 August 1980 have been included.
- (b) Labour costs were increased by 8 per cent over 1979-80 labour costs.
- (c) Seed costs are normally about 78 per cent greater than the basic wheat price; therefore basic seed costs for the 1980-81 season were estimated at \$294 per tonne.
- (d) Bulk fertiliser prices for superphosphate in 1980-81 have increased by 46 per cent from the preceding year⁶.
- (e) Machinery overhead costs include an increase of 20 per cent in repairs and maintenance, an 8.3 per cent increase in the machinery price index, and a 9 per cent increase in the opportunity cost of capital invested.
- (f) Grain drying is assessed as the three year average (1977-78 to 1979-80) plus an allowance for fuel price increases assuming they amount to 75 per cent of total grain drying costs.
- (g) The price of chemicals was the average price of MCPA, MCPB, Avenge, Bandamine M and Trident.

⁶ Ex Ravensdown Fertiliser Works, Hornby 1/8/80

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