

AN ECONOMIC SURVEY
OF NEW ZEALAND WHEATGROWERS:

ENTERPRISE ANALYSIS

SURVEY NO. 6

1981-82

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PREFACE

This Report is the sixth 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 1981-82 wheat crop. An attempt has been made to allocate plant and machinery overhead costs to the wheat enterprise on a 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 visiting each of the farms in the sample after harvest. This field work was carried out by Annette Worsfold, Patrick McCartin, Roger Lough and Michael Rich. Computer programming and analysis was undertaken by Patrick McCartin. The Report was compiled by Roger Lough, Patrick McCartin and Michael Rich.

P.D. Chudleigh
Director

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The Agricultural Economics Research Unit gratefully acknowledges the co-operation of the wheatgrowing farmers who participated in this Survey and who made time and information freely available to our field staff.

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 summarizes information collected from participating farmers for the 1981-82 wheatgrowing season.

1.1 Climatic Conditions

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

North Island (Western Regions)

The mild winter of 1981 and dry early spring conditions allowed early preparation of land and by September sowing was about one month ahead of the previous season. Adequate rainfall in December and a dry January promoted good growth and an early start to harvesting. Yields were good despite the occurrence of stripe rust.

Nelson-Marlborough

A relatively mild winter was evident until August, when cold wet conditions stopped cultivation. After sowing there was a long period of drying winds which caused stress symptoms in some crops. Dry conditions persisted. Stripe rust became evident in Marlborough by November.

Canterbury

The drought conditions of the previous season continued into early winter and allowed the early sowing of autumn wheat, except for the very dry areas where sowing had to be delayed. June was wetter, duller, but milder than usual, especially in North Canterbury. Most winter wheat was sown earlier than usual and rapid germination and good establishment followed. By July stripe rust had appeared on many May sown crops in Mid and North Canterbury. By August spraying for rust was a major operation.

Drying winds in early spring followed by wet cool weather resulted in many crops showing stress symptoms and nitrogen deficiency. Yellow,

¹ Wright, D., Crop Research Division, D.S.I.R.,
pers. comm. 1982.

2.

stunted plants and uneven stands were common.

Very hot, dry, nor-westerly winds during summer, plus the prevalence of stripe rust culminated in pinched grain, high screenings and reduced yield. South Canterbury had more rain than elsewhere and yields were generally good. Harvesting had been completed two or three weeks earlier than normal and the overall wheat area was less than the previous season.

Otago

Mild early winter weather with little rain gave a good spell for autumn wheat sowings and by June wheat had been established under ideal conditions. However, wet weather in August and drying cold winds in September had delayed land preparation for spring sowing, well into October.

By early spring, stripe rust could be found on most winter sown wheat. Central and West Otago had heavy stripe rust infection by November. Reasonable conditions followed and most of the North and Central Otago crop had been harvested by February with good yields. Areas of South and West Otago had harvesting problems. The cool wet autumn delayed harvest until April and many crops registered sprouting. Yields varied between districts; but overall cereal areas were higher than the previous season.

Southland

September was the wettest on record, rainfall being 134 per cent above average. As a consequence no tractor work was done until October, delaying the season. Wheat went into the ground throughout October and early November. Stripe rust was found overwintering on volunteer wheat and was widespread on seedlings in spring sown crops. Moist warm conditions followed, the wheat grew well and the anticipated build up of stripe rust did not occur until mid-December. As in September, January was exceptionally wet and cold with rainfall 142 per cent above normal. Stripe rust was rife at this time.

Harvesting began in March, which was warm and dry to begin with but ended with rain. The season was late because of the wet spring and cool, wet summer. April was reasonably settled and most wheat was harvested by the end of the month. Many crops were harvested with high

moisture levels. An unusual series of climatic conditions resulted in widespread sprouting. A warm, dry March followed by rain then frequent frosts in April with further intervals of fine and wet weather broke the dormancy of Takahe and the worst sprouting for many years occurred.

Like Otago, yields were variable; poor yields usually resulted from take-all or stripe rust. Areas sown to wheat were down slightly on the previous season.

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, sunshine 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, 1981-82

Month	Rainfall	Average Temperature	Days of Deficit	Sunshine
	Percent of normal ^c	Deviation from normal ^c (°C)	Days ^b	Percent of normal ^c
March	101	+1.0	8.4	89
April	90	+1.6	5.9	100
May	53	0.0	3.6	101
June	149	+1.0	0.0	70
July	146	+0.8	0.0	76
August	119	-1.0	0.0	91
September	98	-0.2	0.0	107
October	142	+0.6	0.1	99
November	55	+0.4	0.9	85
December	82	+1.8	13.1	83
January	84	+0.4	16.4	101
February	72	+1.3	16.7	113
March	45	+0.9	16.5	109
April	97	-1.4	1.5	104

^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., 1982.

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 paid for milling standard wheat f.o.r. grower's station, shown in Tables 2 and 3, were up to the 1980 harvest fixed by Government and announced prior to sowing. They also became the maximum prices that could be paid for lower quality wheat. Table 2 shows the long term trend in basic wheat prices for wheat varieties: Aotea, Kopara, Rongotea 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 Australian prices and an estimated Australian price for the coming season announced in December. The scheme also provides for a minimum price which in any season will be 90 percent of the price paid to New Zealand growers in the previous season. The price announced for the 1982 season was \$203 per tonne.

As from the 1981 harvest the New Zealand Wheat Board is empowered to set the levels of premiums and discounts between varieties. Table 3 shows that, relative to the basic wheat price, the Hilgendorf premium was reduced to 17.5 percent and Arawa retained a 5 per cent discount. The Karamu discount remained at the 1981 level of 15 percent for South Island growers excluding Marlborough and 7.5 percent for North Island growers plus Marlborough, for the 1982 harvest.

TABLE 2
Basic Wheat Price Trend

Harvest Year	Price (\$/tonne f.o.r.)	Price Index (1976/77=100)
1966	53.28	48
1967	53.28	48
1968	53.28	48
1969	53.28	48
1970	53.28	48
1971	53.28	48
1972	55.12	50
1973	56.95	52
1974	59.71	54
1975	91.66	83
1976	102.88	94
1977	110.00	100
1978	120.00	109
1979	127.50	116
1980	140.00	127
1981	183.00	166
1982	203.00	185

TABLE 3
Announced Wheat Price Details

Variety	Harvest Year				
	1980 \$/tonne	1981 \$/tonne	1982 \$/tonne	1980-81 % change	1981-82 % change
Aotea, Kopara & equivalent	140.00	183.00	203.00	+ 30.7	+ 10.9
Hilgendorf	168.00	219.00	238.53	+ 30.7	+ 8.60
Arawa	133.00	173.85	192.85	+ 30.7	+ 10.9
Karamu					
S.I.Growers (excl. Marl. 1982)	119.00	155.55	172.55	+ 30.7	+ 10.9
N.I.Growers (incl. Marl. 1982)	119.00	169.28	187.78	+ 42.3	+ 10.9

1.2.2 Levies

The announced prices are subject to a maximum 10 percent levy struck on the basic wheat price by the Wheat Board to offset any losses made from exporting wheat. No retention levy was struck for the 1981-82 season. Table 4 sets out the additional wheat levies payable by growers during 1981-82.

TABLE 4
Additional Wheat Levies, 1981-82

	\$ per tonne
Wheat Research Institute	0.18
United Wheatgrowers (NZ) Ltd	0.37
Federated Farmers of NZ Inc.	0.03
Total:	0.58

1.2.3 Monthly Storage Increments

From 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)				Price Index
		1979	1980	1981	1982 (1976/77=100)	
April	1-15	2.39	3.15	4.12	4.51	180
	16-30	3.19	4.20	5.49	6.09	244
May	1-15	3.98	5.25	6.86	7.61	203
	16-31	4.78	6.30	8.24	9.14	244
June	1-15	5.58	7.36	9.61	10.66	213
	16-30	6.38	8.40	10.98	12.81	256
July	1-15	7.17	9.45	12.36	13.70	219
	16-31	7.97	10.50	13.73	15.23	244
August	1-15	8.77	11.55	15.10	16.75	223
	16-31	9.56	12.60	16.47	18.27	244
September	1-15	10.36	13.65	17.85	19.79	276
	16-30	11.16	14.70	19.22	21.32	244
October	1-15	11.95	15.75	20.59	22.84	228
	16-31	12.75	16.80	21.96	24.36	244
November	1-15	13.55	17.85	23.34	25.88	258
	16-30	14.34	18.90	24.71	27.41	274

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 1981 harvest at the time the sample was finalised, the most recent five year period for which records were available was 1976 to 1980. Approximately 75 percent of those who participated in the 1980-81 survey (Survey No. 5) were retained for the 1981-82 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 a farm visit after the

1982 harvest. 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 1981-82 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 1976 to 1980 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, 1981-82

	Total Number of Wheatgrowers ^a	Number of Farms Surveyed	Proportion of Farms Surveyed	Estimated Proportion of Total Farms
North Island	578	15	0.08	0.08
Canterbury	2817	78	0.43	0.40
South Canterbury	1324	34	0.19	0.19
Southland	2271	53	0.30	0.33
	6990	180	1.00	1.00

^a Source: Hannah, W., N.Z. Wheat Board, pers. comm., 1982.

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 required 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 1981-82 season.

Table 7 shows the number of survey farms which grew wheat in 1981-82, as well as those which had grown wheat in previous seasons but for a number of management reasons, failed to do so in the 1981-82 season.

TABLE 7

Classification of Farms Surveyed, 1981-82

	North Island	Canter- bury	South Canterbury	Southland	All Regions
Farms which harvested wheat	12	64	20	46	142
Farms which did not grow wheat	3	14	14	7	38
Total:	15	78	34	53	180

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 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" to June 1981.

TABLE 8
Government Valuation of Survey Farms^a, 1981-82

	North Island	Canter- bury	South Canterbury	Southland	All Regions
Number of Survey Farms	15	78	34	53	180
Land Value (\$)	441,136	348,584	391,188	334,607	357,686
Value of Improve- ments (\$)	147,446	115,294	138,119	135,967	128,310
Capital Value (\$)	588,582	463,878	529,307	470,574	485,996

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

TABLE 9
Government Valuation per Hectare, 1981-82

	North Island	Canter- bury	South Canterbury	Southland	All Regions
Number of Survey Farms	15	78	34	53	180
Land Value (\$/ha)	1,492	1,745	2,111	1,762	1,814
Value of Improvements (\$/ha)	561	571	681	659	622
Capital Value (\$/ha)	2,053	2,316	2,792	2,421	2,436

2.2 Crop Areas and Production

Table 10 shows average farm areas and crop areas harvested in 1982. Compared to the 1980-81 survey, the "all regions" average wheat area harvested was down 3.3 percent to 20.5 hectares. This decrease was compensated for by an increase in barley area of 65 per cent. As in previous seasons, wheat (20.5 hectares) and barley (17.5 hectares) were the major crops. Small seeds also showed an increase with grass seed up by 4.4 percent and white clover up 2.8 percent. Wheat area harvested was down 26.5 percent in the North Island and 34 percent in South Canterbury, while it increased in Canterbury by 5.4 percent and in Southland 20.3 percent.

Average wheat areas harvested and production for all survey farms in 1981-82 are shown in Table 11. Similiar details for only those farms which grew wheat are given in Chapter 3.

Since all survey farms are included, production is a function of the number of farms growing wheat and the average yield on those farms. Production per farm decreased by only 1.3 percent to 90.71 tonnes despite a fall in wheat area per farm of 3.3 percent.

Average areas and yields for crops other than wheat are presented in Table 12. The table emphasises the increase in barley production. Compared with the previous year the number of farms growing barley increased by 41 per cent while the all regions average area per farm increased by 25.2 per cent to 21.4 hectares.

TABLE 10
Farm and Crop Areas, 1981-82

	North Island	Canter- bury	South Canterbury	Southland	All Regions
Number of Survey Farms	15	78	34	53	180
<u>Farm Area</u>					
Total Farm Area (ha)	268.6	190.4	215.3	195.9	201.3
Potential Cropping Area (ha)	168.3	172.1	198.7	174.9	178.4
Potential Cropping Area as a Prop'n of Total Farm Area (%)	63	90	92	89	89
<u>Cash Crop: Area Harvested</u>					
Wheat Area (ha)	13.3	23.3	17.9	19.6	20.5
Barley Area (ha)	16.4	18.6	32.8	6.0	17.5
Seed Peas Area (ha)	1.4	8.2	5.7	1.3	5.2
Vining Pea Area (ha)	0.9	0.4	2.9	0.0	0.8
Oats Area (ha)	0.2	1.8	10.6	3.0	4.0
Linseed Area (ha)	0.0	0.0	0.0	0.0	0.0
Oilseed Area (ha)	0.0	0.2	0.1	0.2	0.1
Potatoes Area (ha)	1.1	0.5	1.3	0.0	0.3
Maize Area (ha)	4.3	0.1	0.0	0.1	0.3
Grass Seed Area (ha)	4.1	5.8	8.2	0.9	4.7
Clover Seed Area (ha)	1.7	9.5	12.7	1.1	7.2
Other Cash Crop Area (ha)	4.9	3.3	1.4	1.5	2.1
Total Cash Crop Area Harvested(ha)	48.3	71.7	93.6	33.7	62.7
Wheat Area as a Prop'n of Total Cash Crop Area (%)	28	33	19	58	33

TABLE 11
 Wheat Area, Production and Yield
 on all Survey Farms, 1981-82

	North Island	Canter- bury	South Canterbury	Southland	All Regions
Number of Survey Farms	15	78	34	53	180
Area Harvested (ha)	13.3	23.3	17.9	19.6	20.5
Production (tonnes)	56.4	90.1	77.9	105.2	90.7
Production per Hectare (tonnes/ha)	4.2	3.9	4.4	5.4	4.4

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 the June figures with the previous survey shows that the stock units per hectare on farms which grew wheat decreased from 15.79 to 14.62 while the lambing percentage increased relative to the 1980-81 survey figures. On non-wheat growing farms the stocking rate increased from 10.07 to 13.07 stock units per hectare. A comparison as at December 31 with 1980-81 survey figures, shows that carrying capacity per hectare increased in all regions except Southland. The "all regions" farm carrying capacity increased from 18.11 to 20.05 stock units per hectare.

TABLE 13
Livestock Numbers, 1981-82

	North Island	Canter- bury	South Canterbury	Southland	All Regions
Number of Survey Farms	15	78	34	53	180
<u>Farm Area</u>					
Total Farm Area (ha)	268.6	190.4	215.3	195.9	201.3
<u>Livestock Numbers at 30.6.1981</u>					
Ewes	1676	1151	1147	1752	1369
Other Sheep	495	236	264	339	288
Cattle	598	52	75	106	101
Total Stock Units ^a	2769	1439	1486	2197	1758
Stock Units per Available Spring Crazing Area (S.U./ha)					
a)Wheat Farms	18.00	14.73	12.46	15.35	14.62
b)Non Wheat Farms	14.04	14.00	10.25	13.54	13.07
Lambing %					
a) Wheat Farms	94	113	113	116	113
b) Non Wheat Farms	91	103	109	111	106
<u>Livestock Numbers at 31.12.1981</u>					
Ewes	1998	1230	1375	1950	1529
Other Sheep	878	434	634	1178	736
Cattle	607	58	64	113	104
Total Stock Units ^a	3484	1723	2073	3241	2370
Stock Units per Available Summer Grazing Area (S.U./ha)					
	21.72	19.61	17.41	22.09	20.05

^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.

CHAPTER 3
CHARACTERISTICS OF WHEAT PRODUCTION

This chapter deals with wheat area and yield for the 142 survey farms which grew wheat in the 1981-82 season.

3.1 Wheat Area and Production

Table 14 shows that the "all regions" average survey farm which harvested wheat in 1981-82, harvested 26.4 hectares of wheat and produced 116.3 tonnes at an average farm yield of 4.4 tonnes per hectare. This yield was 2.0 per cent more than the 4.3 tonnes per hectare recorded for the 1980-81 survey.

The distribution of survey farms which harvested wheat by area drilled is shown in Table 15 and Figure 1. As with the previous year nearly 68 per cent of survey farms which drilled wheat, drilled less than 30 hectares. However the number growing less than 10.0 hectares decreased while the percentage growing 10.0 to 30.0 hectares increased.

TABLE 14
Wheat Area, Production and Yield
on Survey Farms which Harvested Wheat, 1981-82

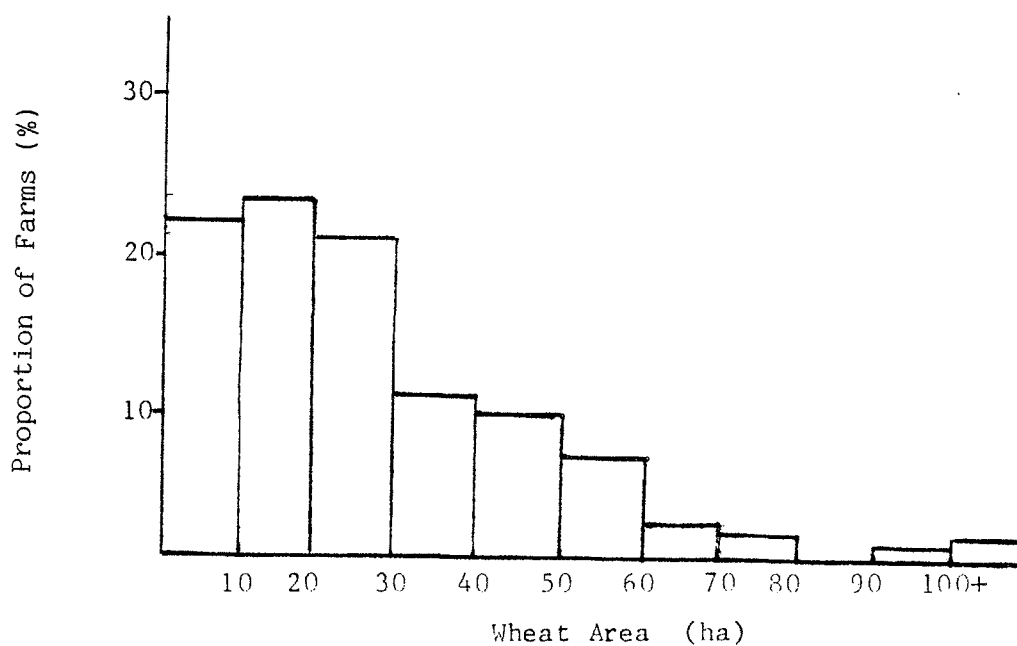
	North Island	Canter- bury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	12	64	20	46	142
Area Harvested (ha)	16.6	28.4	30.3	22.6	26.4
Production (tonnes)	70.6	109.8	132.6	121.2	116.3
Yield (tonnes/ ha)	4.2	3.9	4.4	5.4	4.4

TABLE 15
Distribution of Wheat Area Drilled, 1981-82

	Proportion of Farms (%)				
	North Island	Canter- bury	South Canterbury	Southland	All Regions
Number of Survey Farms which Drilled Wheat	12	64	20	46	142
<u>Wheat Area Drilled (ha)</u>					
0- 9.99	8.33	15.63	20.00	34.78	22.31
10-19.99	75.00	23.44	5.00	28.26	23.69
20-29.99	8.33	20.31	35.00	15.22	21.17
30-39.99	8.33	15.63	10.00	4.35	10.47
40-49.99	0.00	12.50	10.00	6.52	9.44
50-59.99	0.00	4.69	15.00	4.35	6.51
60-69.99	0.00	4.69	0.00	2.17	2.66
70-79.99	0.00	1.56	5.00	0.00	1.71
80-89.99	0.00	0.00	0.00	0.00	0.00
90-99.99	0.00	1.56	0.00	0.00	0.66
100 & above	0.00	0.00	0.00	4.35	1.39
Total	100.00	100.00	100.00	100.00	100.00

FIGURE 1

Distribution of Wheat Area Drilled, 1981-82



Because some wheat is sold as feed wheat and some retained for seed, the Wheat Board does not purchase the total wheat production in any one year. Table 16 gives an estimate of the amount of wheat sold per farm to the Wheat Board from the 1982 harvest. From an average total production of 116.28 tonnes, 83 per cent or 96.01 tonnes was estimated as being sold to the Wheat Board. This is similar to the 1980-81 survey. Thirty eight per cent of total wheat production from North Island survey farms was expected to be sold to the Wheat Board compared to the 51 per cent sold to the Wheat Board during 1980-81, 43 per cent in 1979-80, 16 per cent in 1978-79 and the 1.8 per cent in 1977-78.

TABLE 16
Estimated Wheat Production Sold to the
Wheat Board per Farm, 1982 Harvest

	North Island	Canter- bury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	12	64	20	46	142
Total Production (tonnes)	70.6	109.8	132.6	121.2	116.3
Estimated Wheat Sold to the Wheat Board ^a (tonnes)	26.8	81.7	120.4	109.7	96.0
Wheat Sold to Wheat Board as a proportion of Total Prodn (%)	38	74	91	90	83

^a This is an estimate based on wheat which had been sold at the time of the 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, Rongotea was the most important variety, being sown on 31 per cent of the total wheat area drilled. This was followed by Takahe (19 per cent), Kopara (17 per cent), Oroua (10 per cent) and Hilgendorf (8 per cent).

The proportion of Rongotea drilled increased from less than 1.0 per cent in 1979-80 to 29 per cent in 1980-81, and to 31 per cent in 1981-82. Kopara decreased from 38 per cent in 1979-80 to 15 per cent in 1980-81 and increased to 17 per cent in 1981-82. Tiritea made up 8 per cent of the Southland crop and 3 per cent of the national crop.

TABLE 17

Wheat Varieties by Proportion of Wheat Area Drilled, 1981-82

	Proportion of Wheat Area Drilled (%)				
	North Island	Canter- bury	South Canterbury	Southland	All Regions
Number of Survey Farms which Drilled Wheat	12	64	20	46	142
<u>Wheat Variety</u>					
Kopara	0.0	16.3	13.7	22.7	17.4
Karamu	83.4	3.0	0.0	0.8	5.3
Aotea	0.0	0.0	0.0	0.6	0.2
Takahe	0.0	0.0	0.0	54.7	19.4
Hilgendorf	4.4	10.9	10.1	4.0	8.0
Tiritea	0.0	0.0	1.9	8.3	3.2
Arawa	0.0	3.6	0.0	0.0	1.6
Oroua	0.0	12.7	26.0	0.7	10.3
Rongotea	12.2	50.5	45.6	2.9	31.1
Other	0.0	3.0	2.7	5.3	3.6
Total	100.00	100.00	100.00	100.00	100.00

FIGURE 2

Wheat Varieties by Proportion of
Wheat Area Drilled, 1981-82

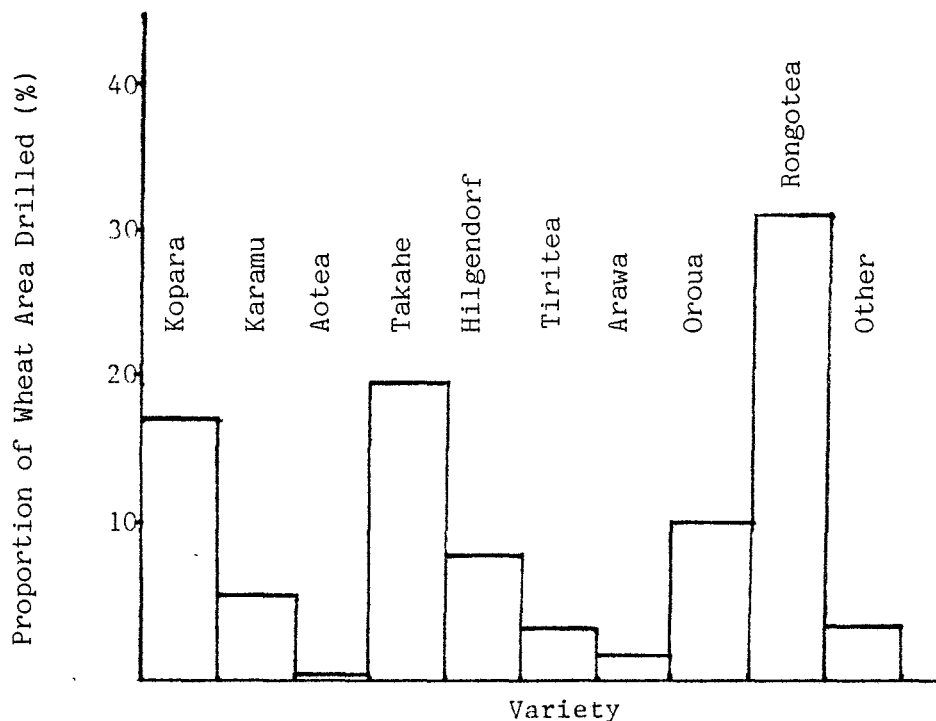


Table 18 presents wheat area and yield per hectare for the different varieties recorded on the survey. Where a single crop of any variety has been grown in a region the details have been deleted from the regional analysis but included in the "all regions" figures. The "all regions" average shows that spring sown Southland varieties (Tiritea and Takaha) outyielded all other varieties while Karamu, Kopara and Oroua outyielded Rongotea.

TABLE 18
Wheat Area and Yield by Variety, 1981-82

	No. of Farms which Harvested variety	Area Harvested ^a (ha)	Av. Yield (tonnes/ ha)	No. of Farms which Harvested Variety	Area Harvested ^a (ha)	Av. Yield (tonnes/ ha)
North Island			Canterbury			
Karamu	10	16.57	4.40	6	9.31	4.52
Kopara	0	0.00	0.0	16	18.45	3.52
Aotea	0	0.00	0.0	0	0.00	0.00
Tiritea	2	15.90	4.35	0	0.00	0.00
Oroua	0	0.0	0.00	13	17.77	4.17
Rongotea	2	12.20	4.52	45	20.42	4.02
Takahe	0	0.00	0.00	0	0.00	0.00
Arawa	0	0.00	0.00	6	11.04	3.68
Hilgendorf	0	0.00	0.00	13	15.22	3.49
Other	0	0.00	0.00	6	9.12	1.31
South Canterbury			Southland			
Karamu	0	0.00	0.00	0	0.00	0.00
Kopara	6	13.85	3.91	18	13.14	5.40
Aotea	0	0.00	0.00	0	0.00	3.15
Tiritea	2	6.00	2.58	7	12.34	6.93
Oroua	7	22.49	4.32	2	3.83	4.34
Rongotea	12	23.04	4.68	0	0.00	0.00
Takahe	0	0.00	0.00	28	20.36	5.65
Arawa	0	0.00	0.00	0	0.00	0.00
Hilgendorf	6	10.20	4.03	2	20.40	4.67
Other	2	8.35	5.00	0	0.00	0.00
All Regions Average						
Karamu	17	7.39	4.50			
Kopara	40	14.87	4.30			
Aotea	0	0.00	0.00			
Tiritea	9	5.21	6.40			
Oroua	22	13.40	4.23			
Rongotea	60	23.88	4.18			
Takahe	28	6.52	5.65			
Arawa	6	4.64	3.68			
Hilgendorf	22	15.50	3.69			
Other	9	22.87	4.52			

^a Averages apply to only those farms that harvested this variety.

CHAPTER 4
MANAGEMENT PRACTICES AND MACHINERY DETAILS

Some of the management practices employed on survey farms which grew wheat in 1981-82 along with farm machinery details, are summarised in this chapter.

4.1 Management Practices

Average sowing and harvesting dates varied considerably among 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 1980-81, the drilling date for Canterbury was 4 days later. The North Island was 19 days later, South Canterbury 11 days earlier and Southland 3 days earlier. The harvest in Canterbury and South Canterbury was earlier than in the preceding year. In Canterbury it was 4 days earlier and in South Canterbury 6 days earlier. In Southland it was 7 days later and the North Island 4 days later.

TABLE 19
Drilling and Harvesting Dates, 1981-82

	North Island	Canter- bury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	12	64	20	46	142
<u>Drilling Date</u>					
<u>1981</u>					
Average	Oct 14	Jul 11	Jul 17	Sept 20	Aug 9
Std Dev. ^a (days)	18	37	40	44	
<u>Harvesting</u>					
<u>Date, 1982</u>					
Average	Feb 14	Jan 26	Feb 1	Mar 21	Feb 14
Std Dev ^a (days)	14	9	12	24	

^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.

Average drilling rates for the four survey regions are shown in Table 20. Increased sowing rates in the areas sowing Autumn wheat reflected an increasing awareness over the last two seasons of the importance of successful germination and plant density.

TABLE 20
Drilling Rates, 1981-82

	North Island	Canter- bury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	12	64	20	46	142
<u>Drilling Rate</u> (kg/ha)					
Average	170	141	147	162	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 topdressed.

Few major differences in management practices were observed between this survey and the previous one (1980-81). The large increase in the use of fungicide was caused by the incidence of Stripe Rust in a major proportion of the crop. Suitable growing conditions in the spring encouraged an increased use of nitrogen in both Canterbury and South Canterbury. However, this was followed by a prolonged dry period resulting in an increased area of wheat being irrigated in Canterbury. The percentage of grain dried at harvest in Southland was similar to the previous season but suitable conditions in South Canterbury resulted in a lower percentage of the South Canterbury crop being dried.

TABLE 21
Management Practices, 1981-82

	Proportion of Farms (%)				
	North Island	Canter- bury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	12	64	20	46	142
<u>Management Practice</u>					
Wheat Crop Undersown with Clover	0	4	2	6	4
Fertiliser Applied at Drilling	100	91	85	96	92
Nitrogenous Fertiliser Applied at Drilling	61	26	14	84	44
Nitrogenous Fertiliser Topdressed	23	39	17	14	26
Weedicide Used	100	81	97	85	87
Insecticide Used	30	17	11	0	11
Fungicide Used	15	79	85	87	80
Wheat Irrigated	0	18	8	1	10
Grain Dried	15	1	14	74	27

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 42); therefore, average tractor hours for cultivation and drilling are presented in Table 22.

Favourable conditions resulted in the time spent in cultivation for the "all regions" survey farm (3.04 hours per hectare) being less than the previous year (3.59 hours per hectare). Drilling time (0.75 hrs per hectare) was also less than the previous year (1.11 hours per hectare).

TABLE 22
Tractor Hours for
Wheat Cultivation and Drilling
1981-82

	North Island	Canter- bury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	12	64	20	46	142
Tractor Cultivation Time (hrs/ha)	2.32	3.14	2.98	3.07	3.04
Tractor Drilling Time (hrs/ha)	0.68	0.81	0.73	0.70	0.75

Information relating to tractor usage, repair costs and value is shown in Table 23. Thirty per cent of all tractors were less than 60 horsepower, 48 per cent were 61-85 horsepower and 22 percent were over 85 horsepower. These large tractors have increased by 11 percent relative to the 1980-81 survey figures. Of the total hours² worked by all tractors, the 61-85 horsepower tractors contributed 53 percent, the less than 60 horsepower contributed 20 percent and the greater than 85 horsepower contributed 26 percent. The total hours worked by these large tractors has increased 5 percent relative to the 1980-81 survey figures.

² Total hours = Number of Tractors X Hours per Tractor

TABLE 23
Tractor Usage, Repair Costs and Value, 1981-82

Tractor Horsepower Age of Tractor (yrs)	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
Number of Tractors	10	22	50	60	51	18	48	12
Annual Usage ^a (Hours/Tractor)	399	289	239	470	469	376	500	407
Annual Repair Cost (\$/Tractor)	95	489	161	344	339	519	778	831
Repair Cost (\$/Hour)	0.24	1.69	0.67	0.73	0.72	1.38	1.55	2.04
Value of Tractors at Cost Price (\$)	11,887	4,488	2,075	16,004	6,530	3,436	26,272	11,745

^a For all tractors the annual usage was 406 hours per tractor

As for the 1980-81 survey, Table 24 indicates a large proportion of Canterbury and South Canterbury wheatgrowers used their own header to harvest their wheat crops. The proportion of Southland wheatgrowers using their own header has increased from 39 per cent in 1979-80 to 43 per cent in 1980-81 and to 52 per cent in 1981-82, while North Island farmers favoured the use of contract harvesting. On average, 74 percent of farms used only their own header, 24 percent used only a contractor, 1 per cent used a contractor as well as their own header, and 2 percent sold their wheat standing.

TABLE 24
Harvesting Method, 1981-82

=====					
Proportion of Farms (%)					
	North Island	Canter- bury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	12	64	20	46	142
Own Header	23	84	97	52	74
Contractor	77	14	3	43	24
Own Header and Contractor	0	2	0	0	1
Sold Standing	0	0	0	5	2
=====					

CHAPTER 5
COSTS AND RETURNS

5.1 Selected Costs and Returns

Table 25 reports costs and returns on a per hectare wheat harvested basis while Table 26 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 wheat cartage to f.o.r. 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
5. Machinery Overhead Costs.

Total variable costs are subtracted from gross revenue to give a gross margin estimate from which machinery overheads are then subtracted³. 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

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

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.⁴ 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 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 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 27 and 28 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 seed wheat for sale or own use.

The revenue per tonne in South Canterbury (\$205.76) was greater than the basic wheat price (\$203) due to 10 per cent of the crop grown being Hilgendorf (which receives a 17.5 per cent premium) and 90 per cent of the total crop being sold to the Wheat Board.

⁴ See Appendix C, Table 45

TABLE 25
Wheat Costs and Returns per Hectare, 1981-82

Average Cost (Return) (\$/ha)					
Number of Survey Farms which Harvested Wheat	North Island 12	Canterbury 64	South Canterbury 20	Southland 46	All Regions 142
1 Establishment Costs	201.81	124.90	125.67	181.69	147.09
2 Growing Costs	48.70	125.62	86.49	86.95	101.19
3 Harvesting Costs	111.55	29.53	23.45	115.07	59.70
4 Cartage Costs	26.53	29.43	25.87	43.73	33.11
5 Total Variable Costs ^a (1+2+3+4)	388.59	309.48	261.48	427.44	341.09
6 Machinery Overhead Costs (Current Cost Basis)	126.97	161.73	142.76	273.87	191.89
7 Total Selected Costs(5+6)	515.56	471.26	404.24	701.31	532.98
8 Gross Revenue	844.31	776.62	860.99	1034.66	880.30
9 Gross Margin (8-5)	455.72	467.14	599.51	607.22	539.21
10 Gross Margin minus Machinery Overhead Costs (9-6)	328.75	305.41	456.75	333.35	347.32

^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 26
Wheat Costs and Returns per Tonne, 1981-82

Average Cost (Return) per tonne Harvested (\$/t)					
Number of Survey Farms which Harvested Wheat	North Island 12	Canterbury 64	South Canterbury 20	Southland 46	All Regions 142
1 Establishment Costs	48.82	35.48	32.89	37.76	36.33
2 Growing Costs	11.34	34.06	21.22	17.52	24.93
3 Harvesting Costs	26.14	8.39	6.07	21.74	13.06
4 Cartage Costs	6.13	7.88	6.31	8.76	7.75
5 Total Variable Costs ^a (1+2+3+4)	92.43	85.81	66.49	85.78	82.07
6 Machinery Overhead Costs (Current Cost Basis)	32.12	44.03	36.18	55.98	45.61
7 Total Selected Costs (5+6)	124.45	129.84	102.67	141.76	127.68
8 Gross Revenue	192.62	200.41	205.77	201.00	201.34
9 Gross Margin	100.19	114.60	139.28	115.22	119.27
10 Gross Margin minus Machinery Overhead Costs (9-6)	68.07	70.57	103.10	59.24	73.66

^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
Sources of Wheat Revenue per Hectare, 1981-82

	Average Gross Revenue (\$/ha)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	12	64	20	46	142
<u>Source of Revenue</u>					
1. Wheat Board	330.32	577.49	766.07	852.31	692.68
2. Stock Feed	287.45	154.96	28.08	46.99	100.39
3. Seed	226.54	44.17	66.84	96.90	74.83
4. Sold Standing	0.00	0.00	0.00	38.76	12.40
5. Insurance Claim	0.00	0.00	0.00	0.00	0.00
<u>Total Revenue</u>	<u>844.31</u>	<u>776.62</u>	<u>860.99</u>	<u>1034.66</u>	<u>880.30</u>

TABLE 28
Sources of Wheat Revenue per Tonne, 1981-82

	Average Gross Revenue (\$/t)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	12	64	20	46	142
<u>Source of Revenue</u>					
1. Wheat Board	83.80	145.67	185.59	162.80	156.44
2. Stock Feed	67.28	42.59	6.64	11.59	26.35
3. Seed	41.54	12.15	13.53	16.71	15.37
4. Sold Standing	0.00	0.00	0.00	9.90	3.17
5. Insurance Claim	0.00	0.02	0.00	0.00	0.00
<u>Total Revenue</u>	<u>192.62</u>	<u>200.41</u>	<u>205.77</u>	<u>201.00</u>	<u>201.34</u>

5.2 Distribution of Returns

Tables 29,30,31 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 \$700-1100, and a gross margin per hectare of \$400-800. Sixty per cent of all farms which harvested wheat made gross margin less machinery overhead costs per hectare of \$200-600. In

Canterbury 40-50 per cent of wheat producing farms had a gross revenue per hectare in excess of \$800, a gross margin in excess of \$500 per hectare and a gross margin less machinery overhead costs in excess of \$300 per hectare.

TABLE 29
Distribution of Gross Revenue, 1981-82

	Proportion of Farms (%)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	12	64	20	46	142
<u>Gross Revenue</u> (\$/ha)					
0 - 100	0.0	0.0	0.0	0.0	0.0
100 - 200	0.0	2.0	0.0	0.0	1.0
200 - 300	0.0	0.0	0.0	0.0	0.0
300 - 400	0.0	0.0	0.0	0.0	0.0
400 - 500	0.0	9.0	5.0	3.0	6.0
500 - 600	17.0	11.0	10.0	4.0	9.0
600 - 700	8.0	11.0	10.0	9.0	10.0
700 - 800	8.0	23.0	10.0	9.0	15.0
800 - 900	25.0	16.0	25.0	4.0	14.0
900 -1000	17.0	9.0	20.0	15.0	14.0
1000-1100	17.0	13.0	5.0	17.0	13.0
1100-1200	8.0	3.0	5.0	11.0	6.0
1200 and above	0.0	3.0	10.0	28.0	12.0
Total	100.0	100.0	100.0	100.0	100.0

TABLE 30
Distribution of Gross Margin, 1981-82

	Proportion of Farms (%)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	12	64	20	46	142
<u>Gross Margin</u> (\$/ha)					
Below 0	0.0	2.0	0.0	0.0	1.0
0 - 100	0.0	3.0	0.0	0.0	1.0
100 - 200	8.0	8.0	5.0	7.0	7.0
200 - 300	17.0	11.0	0.0	7.0	8.0
300 - 400	8.0	19.0	10.0	9.0	13.0
400 - 500	8.0	14.0	10.0	9.0	11.0
500 - 600	34.0	19.0	25.0	20.0	21.0
600 - 700	25.0	8.0	20.0	13.0	13.0
700 - 800	0.0	8.0	10.0	17.0	11.0
800 - 900	0.0	3.0	10.0	13.0	8.0
900 -1000	0.0	6.0	10.0	4.0	6.0
1000-1100	0.0	0.0	0.0	0.0	0.0
1100-1200	0.0	0.0	0.0	0.0	0.0
1200 and above	0.0	0.0	0.0	2.0	1.0
Total	100.0	100.0	100.0	100.0	100.0

TABLE 31
 Distribution of Gross Margin less Machinery
 Overhead Costs, 1981-82

	Proportion of Farms (%)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	12	64	20	46	142
<u>\$/ha</u>					
Below 0	17.0	11.0	5.0	8.0	9.0
0 - 100	8.0	13.0	0.0	7.0	8.0
100 - 200	0.0	11.0	5.0	8.0	8.0
200 - 300	17.0	18.0	10.0	11.0	14.0
300 - 400	8.0	12.0	25.0	19.0	17.0
400 - 500	17.0	11.0	15.0	24.0	16.0
500 - 600	25.0	11.0	15.0	7.0	11.0
600 - 700	8.0	8.0	5.0	11.0	8.0
700 - 800	0.0	4.0	20.0	2.0	6.0
800 - 900	0.0	2.0	0.0	0.0	1.0
900 -1000	0.0	0.0	0.0	0.0	0.0
1000-1100	0.0	0.0	0.0	2.0	1.0
1100-1200	0.0	0.0	0.0	0.0	0.0
1200 and above	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 32 shows that at \$20 per stock unit only 17.3 percent of all survey wheatgrowing farms had a higher gross margin from livestock than from wheat. Table 33 indicates that at \$20 per stock unit, if machinery overhead costs are allowed for, then 27.4 percent of all survey wheatgrowing farms would have a higher return from livestock than from wheat.

TABLE 32
Livestock Versus Wheat Cross Margins, 1981-82

	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	12	64	20	46	142
Wheat Gross Margin (\$/ha)	455.72	467.14	599.51	607.21	539.20
Spring Grazing Stocking Rate (S.U./ha)	18.00	14.73	12.46	15.35	14.62
Livestock Gross Margin at \$20 per S.U.(\$/ha)	360.00	294.60	249.20	307.00	292.40
Farms with Live- stock Gross Margin more than Wheat Gross Margin ^a (%)	25.0 (50.0)	23.4 (31.3)	10.0 (10.0)	13.0 (23.9)	17.3 (25.4)

^a Percentages in () assume a livestock gross margin of \$25 per stock unit.

TABLE 33
 Livestock Versus Wheat Gross Margins Less
 Machinery Overhead Costs, 1981-82

	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	12	64	20	46	142
Adjusted Wheat Gross Margin ^a (\$/ha)	328.75	305.36	456.75	333.34	347.29
Spring Grazing Stocking Rate (S.U./ha)	18.00	14.73	12.46	15.35	14.62
Adjusted Live- stock Gross Margin at \$20 per S.U. ^b (\$/ha)	290.25	237.52	200.92	247.52	235.75
Farms with Adjust- ed livestock Gross Margin greater than adjusted Wheat Gross Margin ^c (%)	41.6 (58.3)	32.8 (45.3)	15.0 (20.0)	26.2 (45.2)	27.4 (40.6)

^a Machinery Overhead Costs subtracted.

^b \$20 per stock unit less opportunity cost of livestock estimated at 15.5 per cent of \$25 per stock unit.

^c Percentages in () assume a livestock gross margin of \$25 per stock unit less opportunity cost of livestock estimated at 15.5 per cent of \$25 per stock unit.

CHAPTER 6

TRENDS IN PRODUCTION, COSTS AND RETURNS

6.1 Wheat Areas

Table 34 compares wheat areas drilled on all survey farms for the 1979-80, 1980-81 and 1981-82 surveys, and lists wheat area intentions for the 1982-83 crop year. These wheat area intentions are what survey farmers were intending to drill at the completion of harvesting in 1982.

TABLE 34
Wheat Areas Drilled and
Wheat Area Intentions

	Wheat Area (ha)			
	1979-80 Survey	1980-81 Survey	1981-82 Survey	1982-83 Intentions ^a
North Island	21.6	18.1	13.3	12.3
Canterbury	23.1	22.1	23.3	20.5
South Canterbury	29.0	27.2	17.9	18.2
Southland	20.8	16.3	19.6	18.3
All Regions	23.5	21.2	20.5	18.9

^a Recorded after harvest on the 1981-82 survey farms.

6.2 Production and Selected Costs

Table 35 shows that in 1981-82 relative to 1976-77, wheat area harvested has declined 8.9 percent while the total area in cash crop increased by 21.7 percent. Increased wheat yields (13.1 percent) plus an increase in the basic wheat price has increased gross revenue by 120.2 percent. Variable costs have increased by 167.9 percent resulting in the gross margin rising by 97.9 percent. However, machinery overheads have increased by 226.0 percent, resulting in a 62.6 percent increase in gross margin less machinery overhead costs.

Table 36 compares the different components of selected costs and an attempt is made to forecast the next annual change in these costs. Total Selected Costs increased from \$267 per hectare in 1978-79 to \$533 per hectare in 1981-82. This represents a 100.0 percent increase over a

four year period. Furthermore, costs are expected to increase a further 15 percent to \$615 per hectare during the period 1981-82 to 1982-83.

TABLE 35
Movement in Wheat Production, Costs and Returns

	1976-77	1981-82	Index for 1981-82 (1976-77=100)
<u>Production</u>			
Wheat Area Harvested (ha)	22.5	20.5	91.1
Total Cash Crop Area Harvested (ha)	51.7	62.9	121.7
Total Stock Units	1926	1758	91.3
Wheat Yield (t/ha)	3.89	4.40	113.1
<u>Costs and Returns</u> (\$/ha)			
Establishment Costs	60.32	147.09	243.8
Growing Costs	16.56	101.19	611.1
Harvesting Costs	37.32	59.70	160.0
Cartage Costs	13.12	33.11	252.4
Total Variable Costs	127.32	341.09	267.9
Gross Revenue	399.79	880.29	220.2
Gross Margin	272.47	539.20	197.9
Machinery Overhead Costs	58.87	191.89	326.0
Gross Margin Less Machinery Overhead Costs	213.60	347.29	162.6

TABLE 36
Trends in Selected Costs

	1978-79	1979-80	1980-81	1981-82	1982-83 ^a	Change 1981-82 to 1982-83
<u>Establishment Costs</u>	\$/ha	\$/ha	\$/ha	\$/ha	\$/ha	%
Cultivation	11.95	14.11	30.97	28.62	36.04	+26
Labour	14.50	17.34	18.10	19.87	22.08	+11
Seed	33.73	35.48	45.21	55.76	61.91	+11
Fertiliser	15.16	19.55	34.91	42.84	45.12	+5
Total	75.34	86.48	129.19	147.09	165.15	+12
<u>Growing Costs</u>						
Harrowing & Rolling	0.14	0.19	0.79	0.39	0.47	+20
Fertiliser	9.50	9.03	12.84	18.52	19.73	+7
Spraying	16.08	21.52	33.29	77.93	94.01	+21
Irrigation	0.57	0.18	3.79	4.35	5.85	+34
Total	26.29	30.92	50.71	101.19	120.06	+19
<u>Harvesting Costs</u>						
Desiccation	0.13	0.49	0.03	0.06	0.07	+17
Machinery & Contractor	22.42	26.15	33.66	34.15	39.54	+16
Labour	5.19	5.93	6.93	6.70	7.44	+11
Bags	0.55	0.65	0.65	0.40	0.44	+10
Grain Drying	11.42	14.66	12.52	14.48	17.96	+24
Insurance	2.73	3.21	3.55	3.92	4.31	+10
Total	42.44	51.09	57.34	59.71	69.76	+17
Cartage Costs	14.13	20.04	30.44	33.11	38.41	+16
Total Variable Costs	158.22	188.53	267.68	341.10	393.38	+15
<u>Machinery Overhead Costs (Current)</u>						
Repairs & Maintenance	17.18	13.82	39.47	41.23	46.05	+12
Depreciation	55.99	69.20	70.87	79.38	86.52	+9
Interest on Book Value	36.02	52.48	54.24	71.28	89.22	+25
Total	109.19	135.50	164.58	191.89	221.79	+16
Total Selected Costs	267.41	324.03	432.26	532.99	615.17	+15

^a Estimates based on assumptions given in Appendix D.

6.3 Returns

Table 37 standardises yearly revenues with respect to varying wheat yields. This is done by calculating revenues based on a constant yield. The constant yield is assessed as the average yield over the period 1976-77 to 1981-82. An attempt is also made to estimate the 1982-83 wheat revenue on the basis of this constant yield.

Table 37 shows that over the four year period 1978-79 to 1981-82 the basic wheat price increased by 59 percent to \$203 per tonne. Similarly the adjusted gross margin increased by nearly 116 percent to \$448 per tonne. This indicates the increase in the basic wheat price covered the increases in total variable costs. The adjusted gross margin less machinery overhead costs also increased during the four year period, from \$225 per hectare to \$256 per hectare indicating that the increases in the basic wheat price offset increases in machinery overhead costs given constant yields.

It is estimated for the 1982-83 season that total variable costs will increase by 15 percent to \$393 per hectare and machinery overhead costs by 16 percent to \$222 per hectare. Given these cost increases and a basic wheat price estimated at \$210 per tonne, it is estimated that the gross margin less machinery overhead costs for 1982-83 will fall to \$193 per hectare.

TABLE 37
Trends in Prices and Revenue

	1978-79	1979-80	1980-81	1981-82	1982-83 ^c
Basic Wheat Price (\$/t)	127.50	140.00	183.00	203.00	210.00
Actual Price ^a (\$/t)	125.59	135.56	179.99	201.34	206.22
Actual Price (% Basic Price)	98.5	96.5	98.4	99.2	98.2
Adjusted Gross Revenue ^b (\$/ha)	492.31	531.40	705.56	789.25	808.38
Total Variable Costs (\$/ha)	158.19	183.53	267.63	341.09	393.38
Adjusted Gross Margin (\$/ha)	334.12	347.87	437.93	448.16	415.00
Machinery Overhead Costs (\$/ha)	109.19	135.50	164.58	191.89	221.79
Adjusted Gross Margin less Machinery Overhead Costs (\$/ha)	224.93	212.37	273.35	256.27	193.21

^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 1981-82 i.e. 3.92 t/ha.

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

APPENDIX A

REGIONAL CLIMATIC DATA

TABLE 38

Weather Indices for North and Central Canterbury
Wheat Growing Areas,^a 1981-82

Month	Rainfall	Average Temperature	Days of Deficit	Sunshine
	Percent of normal ^c	Deviation from normal ^c (°C)	Days ^b	Percent of normal ^c
March	66	+1.3	14.7	86
April	72	+2.2	7.3	105
May	52	-0.1	2.5	103
June	161	+1.5	0.0	46
July	109	+1.0	0.0	86
August	163	-1.1	0.0	73
September	53	-0.1	0.0	112
October	144	+0.6	0.0	101
November	77	+0.2	0.0	83
December	47	+1.9	14.1	85
January	47	+1.0	23.7	103
February	30	+1.4	24.0	111
March	21	+1.4	25.1	109
April	89	-1.5	1.6	85

^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 75mm 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. Met. Service, pers. comm., 1982.

TABLE 39
 Weather Indices for Mid and South Canterbury
 Wheat Growing Areas,^a 1981-82

Month	Rainfall	Average Temperature	Days of Deficit	Sunshine
	Percent of normal ^c	Deviation from normal ^c (°C)	Days ^b	Percent of normal ^c
March	107	+0.8	7.4	91
April	86	+1.3	8.1	98
May	33	-0.1	6.0	103
June	175	+1.1	0.0	71
July	158	+0.9	0.0	72
August	111	-1.2	0.0	95
September	36	-0.2	0.0	117
October	166	+0.8	0.0	100
November	35	+0.2	1.4	86
December	71	+2.0	20.2	86
January	46	+0.7	20.7	107
February	62	+1.6	20.6	115
March	34	+0.9	21.7	120
April	132	-1.7	0.9	104

^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 75mm 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. Met. Service, pers. comm., 1982.

TABLE 40
 Weather Indices for Southland
 Wheat Growing Areas,^a 1981-82

Month	Rainfall	Average Temperature	Days of Deficit	Sunshine
	Percent of normal ^c	Deviation from normal ^c (°C)	Days ^b	Percent of normal ^c
March	103	+0.7	4.0	90
April	132	+1.7	0.5	98
May	85	+0.5	0.0	191
June	84	-0.1	0.0	111
July	119	+0.6	0.0	70
August	98	-0.7	0.0	108
September	298	-0.4	0.0	83
October	117	+0.4	0.0	96
November	52	+1.2	0.0	88
December	143	+1.5	0.0	77
January	228	-0.7	0.0	82
February	131	+0.5	0.0	119
March	83	+0.4	0.0	92
April	38	01.0	0.0	133

^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 75mm 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. Met. Service, pers. comm., 1982.

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 41 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 \$539.20 per hectare, with a R.S.E. of 2.98 percent. In other words one can be 95 percent certain that the true value of the "all regions" average mean gross margin per hectare lies within the range $1.96 \times 2.98 \text{ percent} \times \539.20 either side of the estimated mean. That is, within $\$539.20 + \text{ or } - \31.49 . The North Island figures should be interpreted with caution due to the small sample size.

TABLE 41
Reliability of Survey Wheat Costs and Returns, 1981-82

Number of Survey Farms which Harvested Wheat	North Island 12	Canterbury 64	South Canterbury 20	Southland 46	All Regions 142
Establishment Costs					
- Mean (\$/ha)	201.81	124.90	125.67	181.69	147.09
- R.S.E. (%)	11.36	4.84	10.08	6.35	6.75
Growing Costs					
- Mean (\$/ha)	48.70	125.62	86.49	86.95	101.19
- R.S.E. (%)	12.12	6.55	10.21	6.61	7.62
Harvesting Costs					
- Mean (\$/ha)	111.55	29.53	23.45	115.07	59.70
- R.S.E. (%)	21.11	11.56	17.81	9.48	12.68
Cartage Costs					
- Mean (\$/ha)	26.53	29.43	25.87	43.73	33.11
- R.S.E. (%)	23.62	9.24	16.69	12.51	12.57
Total Variable Costs					
- Mean (\$/ha)	388.59	309.48	261.48	427.44	341.09
- R.S.E. (%)	8.14	1.63	4.99	2.24	2.85
Machinery Overhead Costs					
- Mean (\$/ha)	126.97	161.73	142.76	273.87	191.89
- R.S.E. (%)	17.80	7.38	10.45	6.69	8.33
Total Selected Costs					
- Mean (\$/ha)	515.56	471.21	404.24	701.31	532.98
- R.S.E. (%)	8.19	1.64	4.98	2.31	2.88
Gross Revenue					
- Mean (\$/ha)	844.31	776.62	860.99	1034.66	880.30
- R.S.E. (%)	20.88	8.61	15.98	10.44	11.36
Gross Margin					
- Mean (\$/ha)	455.72	467.14	599.51	607.22	539.21
- R.S.E. (%)	8.57	1.74	5.18	2.31	2.98
Gross Margin Minus Machinery Overhead Costs					
- Mean (\$/ha)	328.75	305.41	456.75	333.35	347.32
- R.S.E. (%)	9.79	2.03	5.40	2.99	3.43

APPENDIX C
BREAKDOWN OF COST ITEMS

The breakdown of the costs and returns for the wheat crop, Table 25, is detailed in Tables 42 to 45. A description of the terms used in these tables is given in Appendix D.

TABLE 42
Establishment Costs, 1981-82

=====					
Average Cost (\$/ha)					
	North Island	Canterbury	South Canterbury	Southland	All Regions

Number of Survey Farms which Harvested Wheat	12	64	20	46	142

<u>Item</u>					
a Cultivation and Drilling					
- Tractor Running	19.17	28.48	26.62	23.59	26.06
b Cultivation and Drilling					
- Labour	15.93	20.16	19.99	20.01	19.87
c Cultivation and Drilling					
- Contractor	25.94	0.72	0.00	1.36	2.03
d Drilling					
- Contractor	4.03	0.00	0.00	1.03	0.53
e Seed	78.07	41.52	54.87	66.85	54.26
f Seed Cartage	1.84	1.18	1.18	2.08	1.50
g Fertiliser	52.69	30.46	21.35	62.95	40.06
h Fertiliser Cartage	4.14	2.38	1.66	3.82	2.78
Total Establishment Costs	201.81	124.90	125.67	181.69	147.09
=====					

TABLE 43
Growing Costs, 1981-82

	Average Cost (\$/ha)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	12	64	20	46	142
<u>Item</u>					
a Harrowing & Rolling - Tractor Running	0.00	0.04	0.48	0.33	0.22
b Harrowing & Rolling - Labour	0.00	0.05	0.32	0.27	0.17
c Fert. Topdressing - Tractor Running	0.35	0.80	0.35	0.20	0.49
d Fert. Topdressing - Labour	0.29	0.47	0.08	0.10	0.26
e Fert. Topdressing - Contractor	0.94	1.74	0.90	0.35	1.08
f Fertiliser	11.84	30.70	4.05	4.87	15.90
g Fertiliser Cartage	0.18	1.57	0.24	0.23	0.79
h Spraying- Tractor Running	0.62	1.28	1.45	1.24	1.27
i Spraying-Labour	0.52	0.98	1.13	1.08	1.02
j Spraying - Contractor	6.85	17.05	15.79	21.75	17.78
k Weedicide - Material	22.19	25.14	27.88	20.07	23.94
l Insecticide - Material	2.88	3.22	1.05	0.00	1.72
m Fungicide - Material	2.04	32.81	32.46	35.92	32.20
n Irrigation - Running	0.00	8.64	0.21	0.21	3.74
o Irrigation - Tractor Running	0.00	0.24	0.01	0.19	0.17
p Irrigation - Labour	0.00	0.89	0.09	0.14	0.44
Total Growing Costs:	48.70	125.62	86.49	86.95	101.19

TABLE 44
Harvesting Costs, 1981-82

	Average Cost (\$/ha)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	12	64	20	46	142
<u>Item</u>					
a Desiccation - Material	0.00	0.12	0.00	0.00	0.05
b Desiccation - Tractor Running	0.00	0.00	0.00	0.00	0.00
c Desiccation - Contract Application	0.00	0.03	0.00	0.00	0.01
d Header - Fuel	0.80	4.30	4.18	2.47	3.51
e Header - Tractor Running	0.00	0.39	0.00	1.59	0.67
f Harvesting - Labour	1.82	7.41	8.45	5.38	6.70
g Harvesting - Contractor	94.05	11.65	3.62	56.71	28.50
h Paddock to Silo - Truck Fuel	0.10	0.09	0.19	0.22	0.15
i Paddock to Silo - Tractor	0.23	1.06	0.43	0.42	0.68
j Paddock to Silo - Truck Hire	9.28	0.00	0.00	0.55	0.64
k Bags (net)	0.00	0.95	0.00	0.00	0.40
l Grain Drying - Own	2.78	0.14	0.88	7.40	2.75
m Grain Drying - Contractor	0.36	0.00	1.71	35.46	11.72
n Crop Insurance	2.13	3.39	3.99	4.87	3.92
Total Harvesting Costs:	111.55	29.53	23.45	115.07	59.70

TABLE 45
Machinery Overhead Costs, 1981-82

	Average Cost (\$/ha)				
	North Island	Canterbury	South Canterbury	Southland	All Regions
Number of Survey Farms which Harvested Wheat	12	64	20	46	142
<u>Item</u>					
a Repairs and Insurance	38.27	34.82	37.97	52.23	41.23
b Depreciation at 15% diminishing value (current cost)	46.76	66.85	55.12	116.87	79.38
c Interest on Capital at 15.5% Cost	41.94	60.06	49.67	104.77	71.28
Total Machinery Overhead Costs	126.97	161.73	142.76	273.87	191.89

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 = \$5.40 per hour

For tractors 61-85 h.p., running costs = \$6.88 per hour

For tractors greater than 85 h.p., running costs = \$8.41 per hour

These costs included diesel fuel costed at 43.2 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 \$5.06 per hour based on the average salary (\$8,184) of full time employees on survey farms, plus an allowance of \$45.00 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 included 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.

(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 topdressed 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:

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

(j) Spraying - Contractor:

Amount paid for contract spraying of wheat crop.

(k) Irrigation - Running:

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

(l) 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).

(m) 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 = 43.2c per litre. Petrol = 46.3c per litre net of 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 \$5.06 per hour as outlined in Establishment Costs 1(b).

60.

(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:

Tractors and Headers = hours on wheat/total hours for the year

Irrigation Equipment = area of wheat irrigated/total area
irrigated with the
same equipment

Cultivation and Spraying Equipment, Trucks, Drill Trailers, Grain Augers etc. = area of wheat/total area cultivated
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 1981-82 wheat crop year. Insurance at 0.45 percent of tractor and header cost is also included.

(b) Depreciation:

Current Cost

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

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

(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.

⁵ Department of Statistics, Monthly Abstract of Statistics.

Interest on capital was than inputed at 15.5 per cent. This is a weighted average of the average overdraft interest rates of Trading Banks applying to Agriculture at September 1981, and the normal interest rates being charged by Stock and Station Agents at that time.

7. Cost estimates for 1982-83 are based on the following assumptions:

- (a) Machinery Expenditure is projected on the basis of the Vehicle Price Index presented in the Monthly Abstract of Statistics.
- (b) Labour costs are projected on advice received from the Department of Labour.
- (c) Seed costs are projected on information received from a Grain and Seed Company.
- (d) Bulk fertiliser prices are based on information received from Ravensdown Fertiliser Works, Hornby.
- (e) The price of chemicals was the average price of MCPA, MCPB, Avenge and Bandamine M; prices were obtained from Chemical Companies.

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