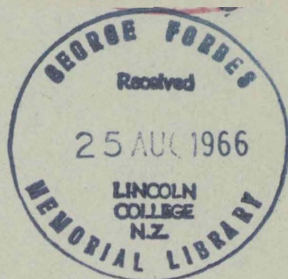


# LINCOLN COLLEGE

(CANTERBURY AGRICULTURAL COLLEGE)

University of New Zealand



## Farm Management and Potential Production in Westland County

W. O. McCarthy

Farm Management  
and  
Potential Production  
in  
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## SUMMARY

The general standard of farm management in Westland county is only fair to average. Production on all farms could be increased by at least 50 per cent. over a five-year period, financed moreover, out of current income.

Dairy farming is characterised by large total areas, but small fully-improved areas. Sharemilking is almost unknown and the majority of farms are one-man units, milking on average, 44 cows. The amounts of winter supplements saved are usually not adequate. Management is weak with regard to provision for shelter and adequate paddock water supply. Pig production is not efficient.

Sheep farms are generally understocked (average carrying capacity 0.95 EE per effective acre). This partly accounts for the high average fat-lamb weight (39.8 lb.) and the high percentage of lambs fat off the mothers (45 per cent.). Wool is regarded as secondary to fat-lamb production, the average fleece weight being 7.7 lb.

The average carrying capacity on cattle farms is one breeding cow per 20 effective acres, with a calving percentage of 92. The fully-improved and topdressed areas are extremely small and supplementary winter feeding is rare.

The financial analysis of 23 farms shows that higher costs of production on the farms with smaller output are due mainly to the disproportionately heavier overhead costs caused in turn by indivisibilities of capital equipment.

The data on labour inputs demonstrated the importance of centrally-situated buildings and the necessity for planning forward and integrating work.

It was found that there were 248,683 acres with some potential. The likely carrying capacity could be (present figures in parenthesis): Dairy cows 26,500 (9,000), sows 1,900 (640), breeding ewes 54,000 (35,000), breeding cows 5,350 (3,600). However, without substantial subdivision of existing holdings it is extremely unlikely that these carrying capacities will be achieved.

## A. INTRODUCTION

This survey was originally presented to Canterbury Agricultural College as a thesis for the Degree of M.Agr.Sc. and the present publication is a condensation of the fundamental material. The objectives of the study were as follows:

(a) To describe farm-management practices with particular reference to dairy farms.

(b) To ascertain costs of production and labour inputs on a selected sample of dairy farms.

(c) To endeavour to correlate management practices with net returns.

(d) To endeavour to assess the reasonable farming potential of the county.

In order to assemble data on labour inputs and financial returns, a representative group of 30 dairy farmers in the Kokatahi and Kowhitirangi areas agreed to keep labour diaries for the period 1 April 1951 to 31 March 1952, and to allow access to their accounts. From a statistical point of view this was a biased selection. One farmer in Grey county, with an extremely high production per cow and per acre also kept a diary. The information he supplied was used only as a basis for comparison and recommendation. The information from some farms was discarded for various reasons, leaving 25 diaries to be used in the analysis of labour inputs and 23 sets of accounts for the financial analysis.

With regard to the information concerning farm-management practices it was decided to collect this by the farm-survey questionnaire method. Because of the large area of the county (see Table 1) a 55 per cent. sample of farms was decided upon.

TABLE 1. WESTLAND COUNTY

	Acres
Holdings of one acre or more . . . . .	733,666
Holdings under one acre . . . . .	188
Occupied by Crown . . . . .	1,187
Occupied by local bodies . . . . .	19,522
Occupied by Maoris (communal system) . . . . .	3,191
Occupied by persons with major area outside county	7,640
Unoccupied Crown land . . . . .	2,041,767
Less area held by farmers in Ross Borough . . . . .	1,035
<b>TOTAL AREA . . . . .</b>	<b>2,806,126</b>

A list of holdings of one acre or more as at 1 April 1952 was compiled from the county rate books, Valuation Department rolls, sheepowners' annual returns and lists of dairy factory suppliers. This was verified by prominent farmers and others. It was found that there were 621 holdings in the county. These were arranged in alphabetical order and numbered consecutively. A table of random numbers was then used to select the sample. Table 2 indicates the breakdown of the holdings.

TABLE 2. TYPE AND NUMBER OF HOLDINGS

Type of holding	Total area (acres)	Area Sampled	Total No. Holdings	No. Holdings Sampled
Mainly butterfat	95,049	47,533	190	117
Mainly sheep	92,004	74,861	49	25
Mainly cattle	434,140	318,390	39	16
Mainly town supply	2,839	1,231	11	5
Part-time	31,524	14,945	83	36
House cow only	2,986	1,021	66	37
Idle and unused for agriculture	75,124	47,380	183	109
Total	733,666	505,361	621	344

The field work was carried out at various times between April and December 1952. The base date for stock figures was taken as 31 March 1952. The management details are for the 1951-52 season.

Although management and other details were collected from the selected farms only, field observations regarding cover, soil type and topography were made on all holdings and on all other occupied and unoccupied land in the county, so that an estimate of potential production could be made.

## B. THE ENVIRONMENT

### 1. HISTORICAL

The area between the Karamea River and Milford Sound (about 7,500,000 acres) was purchased from the Maoris in 1860, but except for the few Maoris and one or two parties of transient prospectors it was practically uninhabited until the gold rushes of 1864-65 and onwards. The present county of Westland was created in 1876. The northern boundary is the Taramakau River and the southern one a line drawn from the northern end of Big Bay to Mount Aspiring.

TABLE 1. LAND CLASSIFICATION AND UTILISATION IN NORTH CANTERBURY

Farm Group No.	Description	Total Land			Forestry and Plantation Reserves		Other Crown Lands		Other Land not in Agricultural Production		Total Land Used for Agriculture			Total Area Not Used for Agriculture in Each Group as a Percentage
		Area Acres	No. of Holdings*	Av. Size of Holding	Area Acres	No. of Holdings	Area Acres	No. of Holdings	Area Acres	No. of Holdings	Area Acres	No. of Holdings	Av. Size of Holdings	
<b>Hill Country</b>														
1.	High country -	2,426,021	—	—	1,014,005†	—	—	—	—	1,412,016	34‡	41,530‡	39.5	
2.	Third-class tussock	294,882	74	3,985	1,058	4	974	6	—	292,850	64	4,576	8.3	
3.	Second-class tussock	249,653	124	2,013	63	1	268	3	70	249,252	118	2,112	7.1	
4.	First-class tussock	304,027	199	1,528	—	—	736	2	—	303,291	197	1,540	8.6	
**	Banks Peninsula -	202,119	649	311	—	—	1,043	9	1,320	200,799	637	315	5.7	
<b>Down Country</b>														
5.	Second-class clay downs -	99,745	220	453	9,927	4	457	2	244	89,117	213	419	2.5	
6.	First-class clay downs -	135,722	459	296	—	—	49	1	465	135,208	456	297	3.8	
<b>Plains Country</b>														
7.	Light land -	368,480	508	725	71,309	18	1,416	6	7,645	288,110	463	622	8.2	
8.	Medium-light land	307,340	1,031	298	1,669	14	1,034	11	1,437	303,200	997	304	8.6	
9.	Medium-heavy land	174,962	1,271	138	—	—	2,129	5	1,375	171,458	1,257	136	5.3	
10.	Heavy land -	65,681	547	120	—	—	60	2	838	64,783	536	121	1.8	
§	Swamp soils -	2,483	34	73	—	—	—	—	—	2,483	34	73	0.1	
§	Saline soils -	17,413	76	229	—	—	473	1	200	16,740	74	226	0.5	
<b>TOTAL</b>		<b>4,648,528</b>	<b>5,192</b>	<b>—</b>	<b>1,098,031</b>	<b>41</b>	<b>8,639</b>	<b>48</b>	<b>13,594</b>	<b>68</b>	<b>3,529,307</b>	<b>5,080</b>	<b>695</b>	<b>100.0</b>
<b>Percentage</b>		<b>100.0</b>	<b>—</b>	<b>—</b>	<b>23.6</b>	<b>—</b>	<b>0.2</b>	<b>—</b>	<b>0.3</b>	<b>—</b>	<b>75.9</b>	<b>—</b>	<b>—</b>	<b>—</b>

\*\*This group of farms was not included in the survey.

§Saline and swamp soils were not included in the survey because of the relatively small areas in each.

†This includes all Crown lands unoccupied, and any other land not in agricultural production.

‡These are stations and are not necessarily holdings.

\*Definition of holding: This is a term used by the Lands and Survey Department to denote a block of land occupied (and farmed) by an individual, partnership, estate, or company as at the date of revision (1948) of the Holdings Maps used. If at that time a farm is in two or more blocks these are all included as one holding. On the other hand a farm may be in two or more holdings if part is leased, is an estate, or is in wife's name or if an additional block of land (adjacent or otherwise) has been purchased since 1948).

then given a number starting from one in each case. A minimum of 25 to 30 farms was then selected for each group, from the numbered holdings lists, by the use of the Table of Random Numbers given in "Statistical Methods" by G. W. Snedecor. In this way a representative random sample of farms was obtained for Groups 2 to 10. It was decided not to sample Group 1 because of the excessive travelling, and the lack of potential for increasing production.

The final sample selected was 250 farms from nine groups.

### **(iii) Collection of Data**

Of the 250 farmers selected, 249 were visited, eight of these, or 3.2 per cent., did not co-operate and another five or 1.6 per cent. were unable to supply sufficient details. The remaining 236 men interviewed supplied full details of their 1952-53 production, the condition of their land and improvements, and their future aims.

### **(iv) The Determination of the Agricultural Potential**

There are a number of concepts in the field of potential. They all commence at the level of present production and all entail various degrees of ability, inclination and supply of capital as far as the individuals farming the land in question are concerned. It is believed that the most important of these concepts is the level of production likely to be achieved by the persons farming the land at present with due regard to these individual limitations. The questionnaire was used to determine this level of future production and it was labelled "Anticipated Likely Potential." The end of ten years was selected as the most appropriate period for such calculations as it was long enough to allow of appreciable increases yet short enough to retain a fair degree of accuracy. These estimates and calculations were therefore essentially based on the farmer's own idea of increases in output. They are recorded in the body of this publication.

It will be seen that these estimates of increases in output vary a great deal from one type of land to another and farm product to product. Over-all perhaps, the order of increase might be about 20 per cent. or two per cent. per year. A level of about double this order of increase, and in some cases quite appreciably more, was labelled "Maximum Economic Potential." It was calculated by means of theoretically removing all the men farming the land at present and replacing them for the next ten years with individuals possessing the resources, both monetary and personal, of the 20 per cent. best farmers at present on the land. This has been omitted from the body of information presented in

this publication as it involves a highly theoretical and in fact an impossible situation. It does indicate however, that a considerable variation in production from the same class of land does exist. This serves to emphasize a point already well known, that there is plenty of scope for extension work in farm management.

### 3. THE PRESENTATION OF THE INFORMATION

The ten main farming types already described have been grouped together as follows:

- (1) The high country or Fourth-class tussock (Group 1).
- (2) The remaining tussock country—the Third, Second and First-class tussock groups 2, 3 and 4.
- (3) The clay downs—Second and First-class—groups 5 and 6.
- (4) The plainsland—light, medium-light, medium-heavy and heavy—groups 7, 8, 9 and 10.

The facts collected in this survey have been presented under the following headings:

- (a) Introductory description.
- (b) Farm output and performance.
- (c) Present production and potential for the future.

This has been recorded for each of the grouping described above except number (1) the high country. This was not surveyed but a brief description based upon a general knowledge of the area is presented here to complete the picture.



## B. REPORT ON FOURTH-CLASS TUSSOCK COUNTRY

### 1. Description of Area

This is the typical Canterbury high country, running parallel to the main divide, and in some cases extending up the main river valleys almost to the divide. On average the soils are skeletal and low fertility. The soils in the group fall mainly into the Tekoa, Koikoi and Kaikoura soil series\*. Except for the Castlehill basin the rainfall of this group is 40 to 60 inches.

The total area of this country occurring in North Canterbury is 1,412,016 acres. Of this area 183,025 acres are included in Tarndale and St. Helens stations which are run by the Lands and Survey Department in conjunction with Molesworth, and carry only cattle; this area is not included in this report. The remaining 1,228,991 acres are held as 31 stations. The average size of station is 39,645 acres.

Three small properties totalling 25,923 acres are run in conjunction with other country and either carry no stock in winter, or all dry stock. There are some fairly large indefinite areas of this country which are not regularly stocked.

### 2. Present Production

The stock carried on this group is 182,753 sheep\*\* and approximately 10,000 cattle.

The average number of sheep per station is 5,896, and the average carrying capacity is 149 sheep per 1,000 acres or one sheep to seven acres.

Some of the stations north of the Waiiau River are changing from sheep to cattle and one station is carrying only cattle.

The production from this class of country is limited almost entirely to fine wool. The ewe breeds are Merino or Half-bred according to the severity of the climate. From the easier country there is a limited sale of c.f.a. ewes and store lambs. On the harder country all hoggets are required to maintain the numbers in the ewe and wether flocks.

Assuming a 12 per cent. winter death rate in sheep this would give a total of 160,823 sheep shorn. Assuming that the average wool clip per sheep is 6.5 lb, this gives a total production of 1,080,350 lb of wool or 3,485 bales.

\*From unpublished map of North Canterbury by P.D. Fox and C. S. Harris.

\*\*From the Return of Sheepowners, 30 June 1951.

### 3. Discussion of Factors Affecting Production on Fourth-class Tussock Country

Climate is a major factor affecting production on this class of country. Snow is a serious problem, causing heavy losses. It is difficult to buy in suitable replacement ewes for this country, so after heavy snow losses it is necessary to breed up the flock from what is left. This is a slow process and snow is a constant pressure keeping stock numbers down.

Finance is more of a limiting factor in this group than in any other covered by this survey. The reason for this is the very extensive nature of the farming, involving high fencing and mustering costs, and any developmental work such as increased subdivision, provision of shelter or top-dressing has to be on a large scale to be effective. The rate of return on money spent on development is lower than the rate earned on other groups, due to the low inherent fertility and poor climate which prevent any substantial increases in stock.

Because of snow, fencing maintenance costs are high, and at present many of the higher fences have been allowed to fall into disrepair.

On the whole the tenure of land in this group is satisfactory, 95 per cent. being leasehold on a long-term basis.

Amenities in this group are poor. The roads are often in bad repair and many occupiers are in danger of isolation each winter due to floods. A large number of runholders are without electricity, postal service, or school bus. In recent years the radio-telephone, and in some cases the aeroplane has assisted in breaking down the isolation of the more remote stations.

The future of production from this high country is closely associated with the price of wool. With continued good prices more money is likely to be spent on maintenance and development. Cattle are likely to play an increasingly important part in the farming of this class of country. The lessees of the stations in the group are largely absentee. In the future there is likely to be a trend towards working owners. This factor combined with a younger generation of managers should result in labour being more easily obtained for this class of country, but the basic labour problem is the isolation and the hard conditions of climate and terrain. It is likely that some of the more remote stations will become absorbed by neighbouring stations, with the result that probably the higher altitudes and more distant valleys will not be regularly grazed, due to the mustering which would be necessary.

A major problem in the South Island high country is

rabbits. While rabbits are a serious problem in parts of the North Canterbury district under discussion the area so concerned is relatively small. Elsewhere in the North Canterbury high country rabbits are absent altogether or confined to small areas in the beds of the streams. This is probably due to the high rainfall and relatively sour soils over most of this area.

In the absence of any technical improvements the future of this class of country seems to be one of maintaining the status quo with some difficulty over the short and medium term future. The difficulties are principally due to problems of labour supply. Due to isolation and the rugged nature of the terrain mechanical aids have been of little value so far and the conditions of labour have not changed much over the years. In contrast working conditions on the lowlands and in the cities have improved a great deal thus making labourers reluctant to go out into the back country or to buy, train and hold the valuable teams of dogs so necessary to the working of this land.

Development in the high country can only be expected when new techniques are developed. The most promising developments so far are:

- (1) The use of the aeroplane in agriculture.
- (2) The use of the bulldozer and four-wheel-drive vehicles.
- (3) The development of cattle.

(1) So far the aeroplane has been confined to spreading rabbit poison where it has proved of great value in saving labour and in fact spreading poison which would not otherwise have been done at all owing to insufficient labour. Its emergency value in dropping supplies to musterers and spotting stock for mustering parties has a limited but important place in operations on some stations.

The most important aspect of the aeroplane is, however, its potential value as a spreader of fertiliser. So far as we know, soil scientists have not yet produced a fertiliser which will pay to apply to high country. Such a fertiliser would have to give economic response in terms of increased wool output to pay for fertiliser costs plus transport and spreading charges. It would need to have large growth stimulating powers per ton and have a relatively low initial cost. Such attributes are essential to overcome the economic difficulties of high transport costs into the back country and the short growing season available. This sets soil scientists a stiff problem, but it is of only recent origin as prior to the aeroplane there was no really promising method of fertilising hill country available.

The basis of pastoral farming in New Zealand has been

the time-honoured practice of liming and fertilising to induce clover growth and so fix atmospheric nitrogen which in turn raised soil nitrogen and stimulated grass growing in association with the clovers. The resultant swards carried more stock whose extra dung and urine further stimulated pasture growth. If some light and relatively cheap fertiliser could be found the process could be commenced in the high country by means of aerial topdressing and the process of very gradual deterioration which has been going on in many areas could be arrested and reversed.

(2) The use of the bulldozer and four-wheel-drive vehicles has been extremely valuable on the easier high country. It has vastly improved the access and saved time and labour for fencing and mustering operations. On the steeper country it is of only limited value.

(3) The development of cattle has been valuable in some high country areas in North Canterbury. Cattle survive snow much better than sheep. While gross receipts from cattle are less than with the same property farmed as a sheep unit the labour required (the biggest expense in the high country) is only a fraction of that required for sheep. Cattle tend to improve high country pastures whereas sheep with their closer grazing habits tend to deteriorate the sward unless carefully managed. With the relatively high prices ruling for cattle in recent years it would not be surprising to see a few more stations changing to cattle if sheep prices fell very much.

The general picture in the high country is for little change in the short and medium terms. The general trend appears to be one of closing down the odd grazing areas less accessible than the average and the outlook appears one of slight contraction rather than expansion in the North Canterbury high country. In view of the extreme importance of this land as catchment areas with resultant implications on lower country regarding flooding and hydro-electric power it is of the greatest importance nationally to keep the country occupied and well managed.

## C. THE REMAINING TUSSOCK COUNTRY— THIRD, SECOND AND FIRST CLASS GROUPS 2, 3 AND 4

### 1. INTRODUCTORY DESCRIPTION

#### (i) Third-class Tussock

This is the steep fescue or hard tussock country adjoining the true high country. The soils are skeletal with significant areas of running shingle and parent rock showing through. The soils of this group fall mainly into the Hurunui soil series\*.

This class of country extends as a strip parallel to the main divide and adjoining the high country. The most significant areas are the hills between the Mason and Conway Rivers north of Waiiau, the hills south of the Hanmer plains, and a strip extending from the Waiiau Gorge to Lees Valley.

The total area of this country occurring in North Canterbury is 294,882 acres in 74 holdings. Of this area 1,058 acres are held for forestry purposes, and 974 acres are occupied by the Crown leaving 292,850 acres in 64 holdings, used for agriculture. The average area of the holdings is 4,576 acres. On the basis of the survey the average farm area was 6,910 acres and the total number of farms was 42.

The details in this report are based on records from 20 farms covering 34 holdings and 138,190 acres or 47 per cent. of the total area.

#### (ii) Second-class Tussock

This is extensive tussock country in the Canterbury foothills, devoted almost entirely to store sheep production. The soil is a fairly shallow stony silt loam—in general it is a skeletal soil on steep to very steep slopes. The parent material is greywacke and some loess. It occurs in the 35 to 50 inch rainfall area, at altitudes between 500 and 2,500 feet. The soils in this group fall mainly into the Haldon soil series\*\*.

The main areas of this class of country are the coastal hills between the Conway and Waiiau Rivers, the hill country along the north bank of the Waiiau from Leslie Hills to Parnassus and a belt running between the Hurunui and Rakaia Rivers.

The total area of this group in North Canterbury is 249,653 acres. Of this area 63 acres are held for forestry, 268 acres are occupied by the Crown and another 70 acres

\*See the extended legend of the Advance Copy of the Soil Map of the Canterbury Plains and Downs.

\*\*From the unpublished soil map of North Canterbury by P. D. Fox and C. S. Harris of the Soil Bureau of the D.S.I.R.

are held for purposes other than agriculture. This leaves 249,252 acres in 118 holdings used for agriculture. Using the survey techniques the total number of farms was 89 and the average size of farm was 2,792 acres.

The details in this report are based on records from 25 farms which covered 34 holdings and 69,822 acres or 28 per cent of the total area.

**(iii) First-class Tussock**

This is the best silver tussock country in North Canterbury and is devoted mainly to store-sheep raising with some fattening. The soils in this group being on steep slopes, tend to be skeletal, with moderate natural fertility. Limestone soils occur throughout most of this hill country. The soils of this group fall mainly into the Haldon, Cheviot, Amuri and Stonyhurst soil series\*.

The average annual rainfall in this group is 25 to 35 inches.

This group includes all the coastal hills from the Waipara to the Waiou Rivers, the Lowry Peaks Range, Cheviot Hills, Waikari Hills and isolated areas of the foothills around the Waitohi Gorge, Mt. Brown and Fighting Hill.

The total area of this country occurring in North Canterbury is 304,027 acres in 199 holdings. Of this area 736 acres are occupied by the Crown, leaving 303,291 acres in 197 holdings used for agriculture. Using the survey technique it was found that the average size of farm was 2,042 acres and the total number of farms 148.

The details in this report are based on records from 28 farms, which were held in 37 holdings on 57,162 acres comprising 18 per cent. of the total area.

The remaining introductory descriptions of the North Canterbury tussock grassland is summarised in Tables 2, 3 and 4 which follow.

\*From the unpublished soil map of North Canterbury by P. D. Fox and C. S. Harris of the Soil Bureau of the D.S.I.R.

**TABLE 2  
THE TOPOGRAPHY OF THE TUSSOCK GROUPS**

	Third-class		Second-class		First-class	
	Area Acres	Percentage	Area Acres	Percentage	Area Acres	Percentage
Unploughable hills and gullies	269,526	92.0	215,790	86.6	216,853	71.5
Ploughable hills (with crawler tractor)	6,006	2.1	15,173	6.1	42,767	14.1
Flats and downs (ploughable wheel tractor)	17,318*	5.9	18,289	7.3	43,674	14.4
<b>Total</b>	<b>292,850</b>	<b>100.0</b>	<b>249,252</b>	<b>100.0</b>	<b>303,291</b>	<b>100.0</b>

\*This flat area consists mainly of inter-montane basins, such as Lees Valley, and is broken by creeks. Most of it contains big stones in the surface layers and consequently cultivation is very limited.

**TABLE 3**  
**THE COVER SUMMARY OF THE TUSSOCK GROUPS**

Type of Cover	Third-class		Second-class		First-class	
	Area Acres	Percentage	Area Acres	Percentage	Area Acres	Percentage
Improved pasture - -	2,239	0.8	14,226	5.7	39,946	13.2
Native pasture - -	178,305	61.6	159,103	63.9	230,180	76.3
Scattered scrub, broom, gorse and matagouri -	90,405	30.5	60,376	24.2	13,546	4.5
Dense and ungrazeable scrub, broom, bush and matagouri - -	12,642	4.3	8,507	3.4	1,662	0.5
Swamp, mainly ungrazeable	4,945	1.7	571	0.2	966	0.3
Fallow - - -	8	—	—	—	1,500	0.5
Grain and pulse crop -	—	—	293	0.1	2,048	0.7
Fodder crop - - -	—	—	—	—	3,920	1.3
Summer forage crop -	53	0.1	275	0.1	—	—
Winter forage crop -	17	—	914	0.4	—	—
Oats for chaff - - -	63	—	—	—	—	—
Lucerne - - -	23	—	514*	0.2	1,536	0.5
Plantations, buildings, yards, waste and unproductive - - -	4,150	1.4	2,902	1.2	7,987	2.2
<b>Total - - -</b>	<b>292,850</b>	<b>100.0</b>	<b>249,252</b>	<b>100.0</b>	<b>303,291</b>	<b>100.0</b>

\*One hundred acres of this area was used solely for grazing.

**TABLE 4**  
**THE DISTRIBUTION OF THE MAJOR SOIL TYPES WITHIN THE SURVEY GROUPING FOR THE THREE TUSSOCK GROUPS**

Group	Third-class		Second-class		First-class	
	Area Acres	Percentage	Area Acres	Percentage	Area Acres	Percentage
Fourth-class tussock 1	32,967	11.3	—	—	—	—
Third-class tussock 2	251,840	86.0	—	—	—	—
Second-class tussock 3	1,680	0.6	223,084	89.5	19,573	6.5
First-class tussock 4	—	—	3,213	1.3	228,459	75.2
Second-class clay downs 5	4,788	1.6	17,029	6.8	13,011	4.3
First-class clay downs 6	—	—	853	0.3	29,309	9.7
Light plainsland 7	—	—	—	—	527	0.2
Light-medium plains 8	1,575	0.5	4,448	1.8	11,140	3.7
Medium-heavy plains 9	—	—	625	0.3	1,272	0.4
Heavy plains 10	—	—	—	—	—	—
<b>Total - - -</b>	<b>292,850</b>	<b>100.0</b>	<b>249,252</b>	<b>100.0</b>	<b>303,291</b>	<b>100.0</b>

## 2. FARM OUTPUT AND PERFORMANCE

A summary of farm output and performance on the tussock farms is presented in the tables which follow—numbers 5 to 9.

**TABLE 5**  
**THE STOCK NUMBERS WINTERED ON THE TUSSOCK COUNTRY**  
**(GROUPS 2, 3 AND 4) IN THE YEAR 1953**

Class of stock	First-class		Second-class		Third-class	
	Per 1000 acres	Per average farm of 2,042 acres	Per 1000 acres	Per average farm of 2,792 acres	Per 1000 acres	Per average farm of 6,910 acres
<b>Sheep:</b>						
Flock ewes } Stud ewes }	710	1,439	496.0	1,390.1	259.9	1,098.1
Dry ewes - -			4.7	13.1		
Ewe hoggets - -	250	513	154.4	432.4	83.6	582.6
2th ewes (not put to ram) - -			4.3	12.0		
Wether hoggets - -	38	77	27.9	78.1	23.5	164.1
Ram hoggets - -	9	18	4.9	13.6	0.4	2.8
Wethers - -	19	45	10.0	27.9	29.4	204.9
Ram stags - -			3.6	10.0		
2th rams (studs) - -			2.1	6.0		
Rams - -	17	35	14.4	40.2	6.9	48.4
<b>Total - -</b>	<b>1,040</b>	<b>2,115</b>	<b>722.3</b>	<b>2,023.4</b>	<b>403.7</b>	<b>2,100.9</b>
<b>Cattle (Beef):</b>						
Breeding cows - -	8	16	11.2	31.2	4.8	33.7
Dry cows - -			0.1	0.2	0.1	0.5
Weaners - -	10	20	5.9	16.4	1.4	9.8
Yearlings - -			4.0	11.1	1.3	9.1
Two and three year dry stock - -	13	27	0.7	1.9	0.5	3.3
Yearling and 2 year bulls (not in use) - -			0.7	1.8	0.2	1.5
Bulls - -			0.4	1.0		
House cows - -	2	33	2.5	7.0	0.8	5.0
<b>Total Beef Cattle - -</b>	<b>33</b>	<b>66</b>	<b>25.5</b>	<b>70.6</b>	<b>9.1</b>	<b>62.9</b>
<b>Horses - -</b>	<b>2.0</b>	<b>4.2</b>	<b>1.5</b>	<b>4.0</b>	<b>2.3</b>	<b>8.6</b>

**TABLE 6**  
**THE DISTRIBUTION OF THE VARIOUS BREEDS OF RAMS AND EWES ON THE TUSSOCK COUNTRY FOR THE 1952-53 SEASON**  
**RAMS**

Breeds	First-class Percentage	Second-class Percentage	Third-class Percentage
Corriedale - -	47.9	46.6	
Half-bred - -	39.9	34.3	93.3
Southdown - -	4.1		0.6
Romney - -	2.2	11.5	4.9
Merino - -	3.0	2.5	1.2
English Leicester - -	1.5		
Southdown-Border Leicester - -	.9	.6	
Shropshire - -	.5		
Border Leicester - -		4.5	
	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>



TABLE 6—EWES—Continued.

Breeds	First-class Percentage	Second-class Percentage	Third-class Percentage
Romney - - -	—	7.7	10.5
Half-bred - - -	—	32.7	89.5
Corriedale - - -	—	49.9	—
Threequarter-bred - - -	—	8.4	—
Merino - - -	—	1.3	—
	—	100.0	100.0

TABLE 7—THE STOCK PERFORMANCE OF THE TUSSOCK INCREASE AT THE END OF TEN YEARS.

	First-class Percentage	Second-class Percentage	Third-class Percentage
<b>Sheep:</b>			
Lambing Percentage -	91.4	83.0	70.0
Ewe death rate -	5.02	6.5	6.7
Hogget death rate -	8.08	5.0	12.6
Lamb death rate (after docking) - -	5.43	4.6	6.3
Ratio of rams to ewes	1.41	1.35	1.38
<b>Cattle:</b>			
Calving percentage -	90.4	88.0	80.0
Death rate (cows) -	3.3	3.6	2.7
Cattle to sheep ratio -	1.32	1.32	1.49
Ratio bulls to cows -		1.27	1.22
Calf mortality -		1.3	3.7

NOTE: Death rates include killers.

TABLE 8—THE WOOL AND STOCK PRODUCTION FROM THE TUSSOCK COUNTRY IN THE 1952-53 SEASON

Product	First-class Tussock Production		Second-class Tussock Production		Third-class Tussock Production	
	per 1000 acres	per av. farm of 2042 ac.	per 1000 acres	per av. farm of 2,792 ac.	per 1000 acres	per av. farm of 6910 ac.
<b>Sheep:</b>						
Fat Ewes - -	30	49	2.7	7.6	—	—
Fat Wethers - -	9	19	2.2	6.3	1.1	7.4
Fat Lambs - -	144	293	21.1	59.0	2.9	20.0
C.F.A. Ewes - -	116	237	96.9	271.4	59.5	415.1
Cull 2th Ewes - -	60	122	10.5	29.3	5.2	36.1
In-lamb ewes - -					0.4	2.5
Store lambs - -	169	345	178.5	500.0	63.6	443.3
Flock rams - -	6	12	2.3	6.4	8.4	58.8
Store wethers - -	7	13	3.8	10.6		
<b>Wool:</b>						
Wool weight per acre - - -		8.3		5.4		
		lbs per acre		lbs per acre		
Wool weight per sheep - - -		8.09		7.8		6.57
		lbs per sheep*		lbs per sheep†		lbs per sheep†
<b>Cattle:</b>						
Fat cows - -	0.5	1.0	0.05	0.1	0.1	0.8
Fat dry cattle - -	5	9	0.1	0.3	0.4	2.7
Weaners - -	1	3	4.0	11.1	2.2	15.5
Store dry cattle - -	4	8.3	3.3	9.3	0.7	5.1
Bulls - -			0.4	1.2		

\*Includes lambs' wool.

†Does not include lambs' wool.

TABLE 9

THE DISTRIBUTION OF CROPS AND THE CROP OUTPUT FROM THE  
TUSSOCK COUNTRY FOR THE SEASON 1952-53

Crop	CROP PRODUCTION					
	First-class		Second-class		Third-class	
	Area per av. Farm Acres	Average yield	Area per av. Farm Acres	Average yield	Area per av. Farm Acres	Average yield
<b>Feed Crops:</b>						
Summer forage crops	17	—	3.1	—	1.3	—
Winter forage crops	9	—	10.3	—	0.4	—
Greenfeed	8	—	8.1	—	—	—
Oats for chaff	2.2	2½ tons	—	—	1.5	2 tons
Lucerne hay	11	74 bales per acre	4.7	99 bales	0.5	105 bales
Meadow hay	10		8.1	88 bales	2.0	68 bales
Silage	—	—	2.6	1.4 tons	—	—
New grass	—	—	5.3	—	2.2	—
New lucerne	—	—	0.3	—	—	—
New grass undersown	—	—	2.3	—	—	—
<b>Small Seeds:</b>						
Ryegrass	2.4	—	2.0	—	—	—
White clover	1.6	—	2.7	66 lb M.D.	—	—
Red clover	—	—	0.7	136 lb M.D.	—	—
Total area closed for seed	4.0	—	5.4	—	—	—
<b>Grain and Pulse Crops:</b>						
Wheat	6.3	48 bush.	1.2	35 bush.	—	—
Oats	3.1	52 bush.	—	—	—	—
Barley	1.8	46 bush.	1.7	32 bush.	—	—
Peas	0.3	—	—	—	—	—
Linseed	—	—	0.4	5 cwt	—	—
Total grain and pulse crops	11.5	—	3.3	—	—	—

**(iii) Present Production and Potential for the Future**

A summary of the present stock numbers and stock production and the anticipated increase at the end of ten years is presented in Tables 10 and 11. Cropping is relatively unimportant on this class of country and so has been omitted.

TABLE 10

THE 1952-53 STOCK NUMBERS ON THE TUSSOCK COUNTRY AND THE ANTICIPATED INCREASE AT THE END OF TEN YEARS

Class of stock	First-class Tussock			Second-class Tussock			Third-class Tussock		
	Present Numbers	Increased Numbers	Per cent Increase	Present Numbers	Increased Numbers	Per cent Increase	Present Numbers	Increased Numbers	Per cent Increase
<b>Sheep:</b>									
Ewes } - - -				123,750	28,618	23.1			
Dry ewes } - - -	-214,475	47,860	22.3	1,167	-1,167	-100.0	76,119	5,760	7.6
Ewe hoggets - - -	76,418	9,240	10.2	38,481	14,348	37.3	24,469	2,695	11.0
2th ewes (not put to ram) - - -				1,071	179	15.3			
Wether hoggets - - -	11,513			6,951	-3,095	-44.5	6,892	1,378	20.0
Ram hoggets - - -	2,681			1,214	357	29.4	116		
Wethers - - -	5,706	-2,720	-47.7	2,485	-461	-18.6	8,604	60	0.7
Rams - - -	5,236	1,050	20.2	4,469	773	21.6	2,031	260	12.8
2th rams - - -				525					
<b>Total sheep</b> - - -	<b>-315,082</b>	<b>55,340</b>	<b>17.9</b>	<b>180,049</b>	<b>39,552</b>	<b>22.0</b>	<b>118,231</b>	<b>10,153</b>	<b>8.6</b>
<b>Cattle (Beef):</b>									
Breeding cows - - -	2,401	2,334	97.2	2,781	2,735	98.3	1,415	1,122	79.3
Dry cattle - - -	7,500	1,662	20.6	2,898	1,796	62.4	1,014	790	77.9
<b>Total beef cattle</b> - - -	<b>9,901</b>	<b>3,996</b>	<b>38.1</b>	<b>5,679</b>	<b>4,531</b>	<b>79.8</b>	<b>2,429</b>	<b>1,912</b>	<b>78.7</b>
Cattle grazed over summer)							(315)		
Cattle grazed over winter)				(268)					

TABLE 11

## THE 1952-53 STOCK PRODUCTION AND THE ANTICIPATED INCREASE AT THE END OF TEN YEARS

Product	First-class Tussock			Second-class Tussock			Third-class Tussock		
	Present Totals	Increased Numbers	Per cent Increase	Present Totals	Increased Numbers	Per cent Increase	Present Totals	Increased Numbers	Per cent Increase
<b>Sheep and Cattle:</b>									
Fat lambs - - -	43,583	22,140	50.8	5,255	6,387	121.5	840	—	—
Fat ewes and wethers -	10,097	900	9.9	1,235	E.678 W.182	100.0 32.7	W.435	E. — W. 405	— 48.2
Fat cattle - - -	1,514	1,120	73.9	32	55	177.4	149	-44	-29.5
Store lambs - - -	51,390	9,810	19.1	44,486	6,479	14.6	18,619	1,303	7.0
Store cattle - - -	1,703	1,825	107.1		3,047	153.0	868	1,152	133.5
C.F.A. ewes - - -	35,242	10,270	29.1	24,158	9,271	38.4	17,539	—	—
Cull 2th ewes - - -	18,143	7,100	39.2	2,610	6,330	242.5	1,516	578	38.1
Store wethers - - -				939	489	52.1	2,470	953	38.6
<b>Wool:</b>									
Weight in lb -	2,511,457	524,200	20.9	1,339,307	332,705	24.8	804,588	68,231	8.5

## D. THE CLAY DOWNS

### 1. INTRODUCTORY DESCRIPTION

#### (i) Second-class Clay Downs

This country comprises the poorer and steeper foothills adjoining the tussock country. It is not suitable for cereal cropping. The soil is poorly drained, being six to nine inches of pale grey silt loam top-soil, on a stiff mottled clay sub-soil. It occurs mainly in the area of 30 to 50 inch rainfall. These soils fall mainly into the Okuku, Mt. Somers and Wairiri soil series\*.

This group of soils extends as a relatively narrow strip along the foot of the tussock country between the Waipara and Rakaia Gorges. The most extensive areas are the Mt. Grey Downs and the Wairiri Valley.

The total area of this country occurring in North Canterbury is 99,745 acres in 220 holdings. Of this area 9,927 acres are held for forestry purposes, 457 acres are occupied by the Crown and 7,768 acres are held for purposes other than agriculture. This leaves 89,117 acres in 213 holdings, used for agriculture. From the survey it was found that the average size of farm was 1,017 acres and the total number of farms was 88.

The details in this report are based on records from 25 farms which were held in 32 holdings on 25,419 acres covering 28.5 per cent of the total area.

#### (ii) First-class Clay Downs

This group consists of the good arable clay downs of North Canterbury. It includes the Cheviot-Parnassus basin, the downs north and east of Waiau, the downs surrounding the Waikari flat, the Waikari Upper Omihi and Greta Valleys, the lower Mt. Grey Downs between Balcairn and Loburn, the lower Mairaki Downs, and the lower downs between Coalgate and Glenroy.

\*See the extended legend accompanying the Advance Copy of the Soil Map of the Canterbury Plains and Downs.

The soils fall mainly into the Mairaki series\*\*. On average there is seven to ten inches of topsoil on a stiff clay subsoil. Drainage is poor, tending to make soils very wet in winter. In the periodic dry summers soils can dry out badly. The average annual rainfall varies between 25 and 35 inches.

This country is suitable for growing grain and pulse crops, although at present the emphasis is mainly on fat-lamb and wool production.

The total area of this class of country in North Canterbury is 135,722 acres held in 459 holdings. Of this, 514 acres are not in agricultural production, leaving 135,208 acres in 456 holdings covered by the survey. Using the survey technique it was found that the average size of farm was 487 acres and the total number of farms was 278.

The details in this report are based on records from 31 farms which were held in 43 holdings on 15,105 acres covering 11.2 per cent of the total area.

The remaining introductory description of the North Canterbury clay downs is summarised in Tables 12, 13 and 14 which follow:

TABLE 12  
THE TOPOGRAPHY OF THE CLAY DOWNS COUNTRY

	Second-class		First-class	
	Area Acres	Percentage	Area Acres	Percentage
Unploughable hills - -	28,017	31.4	10,427	7.7
Ploughable hills (with a crawler tractor) - -	27,304	30.6	19,537	14.5
Flats and downs (ploughable with a wheel tractor) -	33,796	38.0	105,244	77.8
Total - - - -	<u>89,117</u>	<u>100.0</u>	<u>135,208</u>	<u>100.0</u>

\*\*See the extended legend accompanying the Provisional Soil Map of the Canterbury Plains and Downs.

TABLE 13

## THE COVER SUMMARY OF THE CLAY DOWNS COUNTRY.

Type of Cover	Second-class		First-class	
	Area Acres	Percentage	Area Acres	Percentage
Improved pasture - -	24,422	27.4	94,633	70.0
Native and reverted pasture	24,819	27.8	15,877	11.7
Scattered scrub, broom and gorse - - -	25,015	28.2	1,128	0.8
Dense and ungrazeable scrub, broom and gorse	7,707	8.6	250	0.2
Swamp—mainly ungrazeable	74	0.1	814	0.6
Fallow - - -	977	1.1	3,714	2.7
Grain and pulse crop - -	565	0.6	6,611	4.9
Summer forage crop - -	1,058	1.2	4,556	3.4
Winter forage crop - -	1,463	1.6	1,718	1.3
Oats for chaff - - -	—	—	242	0.2
Lucerne - - -	588	0.7	2,345	1.7
Plantations, buildings, yards, waste and unproductive -	2,429	2.7	3,320	2.5
Total - - - -	89,117	100.0	135,208	100.0

TABLE 14

## THE DISTRIBUTION OF THE MAJOR SOIL TYPES WITHIN THE SURVEY GROUPING FOR THE CLAY DOWNS

Soil Classification	Group	Second-class		First-class	
		Area Acres	Percentage	Area Acres	Percentage
Fourth-class Tussock	1	1,750	2.0	—	—
Third-class Tussock	2	—	—	—	—
Second-class Tussock	3	3,126	3.5	—	—
First-class Tussock	4	1,603	1.8	7,231	5
Second-class clay downs	5	74,339	83.4	2,541	2
First-class clay downs	6	4,099	4.6	116,582	85
Light plainsland	7	—	—	916	1
Light-medium plainsland - - -	8	4,025	4.5	4,296	3
Medium-heavy plainsland - -	9	175	0.2	3,642	3
Heavy plainsland	10	—	—	—	—
Total - - - -	-	89,117	100.0	135,208	100.0

## (ii) Farm Output and Performance

A summary of farm output and performance on the clay downs is presented in the tables which follow—numbers 15 to 20.

TABLE 15

Class of stock	First-class per 1000 acres	Clay Downs Per av. Farm of 487 acres	Second-class per 1000 acres	Clay Downs Per av. Farm of 1,017 acres
<b>Sheep:</b>				
Stud ewes	1,630	796	787.8	797.7
Flock ewes				
Ewe hoggets	380	184	236.4	239.4
Wether hoggets	100	51	41.4	42.0
Wethers	20	10	28.0	28.3
Rams	30	15	18.7	19.0
Ram hoggets	30	13	—	—
Total sheep	2,190	1,069	1,112.3	1,126.4
<b>Cattle—Beef:</b>				
Breeding cows	1.3	0.65	4.7	4.7
Weaners	8.5	4.17	2.9	2.9
Yearlings	4.0	1.94	4.3	4.3
Two-three year dry cattle	4.0	1.94	1.3	1.3
Bulls	0.1	—	0.2	0.2
Total beef cattle	17.9	9.63	13.4	13.4
<b>Cattle—Dairy:</b>				
Milking cows	10	5.3	4.9	4.9
Weaners	10	2.4	2.6	2.6
Yearlings		1.0	1.3	1.3
Two-three year dry stock		0.1	—	—
Bulls	—	—	0.2	0.2
Total dairy cattle	20	8.8	9	9
<b>Other Stock:</b>				
Draught horses	—	0.55	—	.4
Hacks	—	0.94	—	2.6
Race horses	—	—	—	.2
Sows	—	0.10	—	.4
Boars	—	0.03	—	.1

TABLE 16  
THE DISTRIBUTION OF THE VARIOUS BREEDS OF RAMS  
USED IN CLAY DOWNS FOR THE 1952-53 SEASON

Breeds	First-class Clay Downs Percentage	Second-class Clay Downs Percentage
Southdown	27.2	7.1
Corriedale	26.2	33.3
Romney	16.8	15.5
Half-bred	10.0	38.6
South Suffolk	8.1	—
Threequarter-bred	4.0	—
Border Leicester x Southdown	1.9	2.7
Lincoln	1.6	—
English Leicester	1.6	—
Suffolk	1.3	—
Suffolk Down	0.7	—
Border Leicester	0.3	Shropshire 1.1
Ryeland	0.3	Merino 1.7
	100.0	100.0



**TABLE 17**  
**THE STOCK PERFORMANCE ON THE CLAY DOWNS COUNTRY**  
**FOR THE 1952-53 SEASON**

	First-class Clay Downs Percentage	Second-class Clay Downs Percentage
<b>Sheep:</b>		
Lambing - - - -	104.6	94.7
Ewe mortality - - -	7.1	5.5
Hogget mortality - - -	6.6	5.0
Lamb loss (after docking) -	7.0	3.8
Ratio of rams-ewes - - -	1.40	1.42
<b>Cattle (Beef):</b>		
Calving - - - -		88
Cow mortality - - -		2.5
Cattle to sheep ratio - - -		1.83
<b>Cattle (Dairy):</b>		
Calving - - - -	90	89
Cows' death rates - - -	1	1.6
Calf mortality - - -	5	
Cattle (dairy + beef) to sheep ratio - - - -	1.58	1.50

NOTE: Mortalities include stock killed for meat and unaccountable losses as well as deaths.

**TABLE 18**  
**THE WOOL AND STOCK PRODUCTION FROM THE CLAY**  
**DOWNS COUNTRY IN THE 1952-53 SEASON**

Product	First-class Clay Downs Production		Second-class Clay Downs Production	
	Per 1000 acres	Per av. Farm of 487 acs.	Per 1000 acres	Per av. Farm of 1,017 acres
<b>Sheep:</b>				
Fat ewes - - - -	230	106	27.5	27.9
Fat wethers - - - -	50	26	21.1	21.4
Fat lambs - - - -	1,320	643	202.5	205.1
C.F.A. ewes - - - -	60	30	114.4	115.8
Cull 2th ewes - - - -	20	7	6.7	6.8
In-lamb ewes - - - -	20	9	—	—
Store lambs - - - -	80	38	180	182.3
Store wethers - - - -	20	8	3.1	3.2
<b>Wool:</b>				
Wool weight (lb per acre)		19.1		8.05
Wool weight (lb per sheep)		9.6		7.95
<b>Cattle:</b>				
Fat cows (dairy and beef) -	0.7	0.32	0.2	0.3
Fat dry cattle - - - -	1.3	0.61	2.3	2.4
Weaners - - - -	0.3	0.16	2.1	2.1
Store dry cattle - - - -	1.4	0.68	3.7	3.8
Store cows (dairy) - - -	1.0	0.48	0.4	0.4
Bobby calves (dairy) - -	5.1	2.49	1.7	1.8
<b>Butterfat:</b>		533 lb		
<b>Pigs:</b>		Neg.		

TABLE 19

THE DISTRIBUTION OF CROPS AND THE CROP OUTPUT  
FROM THE CLAY DOWNS COUNTRY FOR THE SEASON  
1952-53.

Crop	1st Class Area per av. Farm in acres	Clay Downs Average Yield	Second-class Area per av. Farm in acres	Clay Downs Average Yield
<b>Feed Crops:</b>				
Summer forage crops	16.4		12.0	
Winter forage crops	6.2		16.6	
Greenfeed - - -	7.4		5.9	
Lucerne hay - - -	7.3	84 bales	4.0	118 bales
Meadow hay - - -	23.7	60 bales	12.1	64 bales
Silage - - -	1.8	2.55 tons	5.4	1½ tons
Oats for chaff - -	0.9	2 tons		
<b>Small Seeds:</b>				
Ryegrass - - -	6.7	17.7 bush.	6.3	24 bush.
H1 - - -	2.9	12.8 bush.		
White clover - - -	20.9	128 lb		84 lb
Red clover - - -	1.4	124 lb	0.4	100 lb
Phalaris - - -	0.5	93 lb		
<b>Total Area Seed</b> - -	<b>32.4</b>		<b>11.0</b>	
<b>Grain and Pulse Crops:</b>				
Wheat - - -	13.2	37 bush.	2.8	30 bush.
Oats - - -	1.6	27 bush.		
Barley - - -	5.5	39 bush.	2.8	48 bush.
Garden Peas - - -	0.2	30 bush.		
Partridge Peas - -	0.8	36 bush.		
Ryecorn - - -	0.2	12 bush.		
Linseed - - -	2.5	.48 tons	0.8	5.1 cwt.
<b>Total Grain and Pulse Crop</b> - - -	<b>24.0</b>		<b>6.4</b>	

NOTE: All yields have been expressed on a machine dressed basis. In cases where seed was sold as farmers dressed, a deduction of one-third was made to allow for dressing loss. Most yields were well below average due to poor harvesting conditions.

### (iii) Present Production and Potential for the Future

A summary of the present stock numbers and the anticipated increase at the end of ten years is presented in Table 20. Table 21 covers the output or sales of stock and crops from the clay downs at present and the estimated improvement at the end of ten years.

**TABLE 20**  
**THE 1952-53 STOCK NUMBERS ON THE CLAY DOWNS AND THE**  
**ANTICIPATED INCREASE AT THE END OF TEN YEARS**

Class of Stock	First-class Clay Downs			Second-class Clay Downs		
	Present Numbers	Increased Numbers	Percentage Increase	Present Numbers	Increased Numbers	Percentage Increase
<b>Sheep:</b>						
Stud ewes -	10,310					
Flock ewes -	210,478	28,129	12.7	70,203	31,822	45.3
Ewe hoggets -	50,943	15,699	30.8	91,063	11,540	54.8
Wether hoggets -	14,132	-3,034	-21.5	3,693	511	13.8
Wethers -	2,792	-680	-9.5	2,492	-1,190	-47.8
Rams -	5,551	671	12.1	1,669	568	34.0
Ram hoggets -	3,553					
<b>Total sheep -</b>	<b>296,759</b>	<b>40,785</b>	<b>13.7</b>	<b>99,120</b>	<b>43,251</b>	<b>43.6</b>
<b>Cattle (Beef):</b>						
Breeding cows -	179	197	110.1	417	1,288	308.8
Dry cattle -	2,489	2,488	100.0	778	1,571	201.9
<b>Total beef cattle -</b>	<b>2,668</b>	<b>2,685</b>	<b>100.7</b>	<b>1,195</b>	<b>2,859</b>	<b>239.2</b>
<b>Cattle (Dairy):</b>						
Milking cows -	1,477	-152	-10.3	438	21	4.8
Dry cattle -	958	1,306	136.3	368	-53	14.4
<b>Total dairy cattle -</b>	<b>2,435</b>	<b>1,154</b>	<b>47.4</b>	<b>806</b>	<b>-32</b>	<b>4.0</b>

**TABLE 21**  
**THE OUTPUT OF STOCK AND CROPS FROM THE CLAY DOWNS IN**  
**1952-53 AND THE ANTICIPATED INCREASE AT THE END OF TEN**  
**YEARS**

Product	First-class Clay Downs			Second-class Clay Downs		
	Present Numbers	Increased Numbers	Percentage Increase	Present Numbers	Increased Numbers	Percentage Increase
<b>Sheep:</b>						
Fat lambs -	178,284	28,058	15.7	18,046	15,792	87.5
Fat ewes -	29,517	13,980	47.4	2,454	2,268	92.4
Fat wethers -	7,160	-752	-10.5	1,883	77	4.1
C.F.A. ewes -	8,359	1,271	11.7	10,192	2,475	24.3
2th ewes -	2,407	-2,407	-100	595	6,069	1,020.0
Store wethers -				280	-105	-46
Store lambs -	10,516	-10,516	-100	16,045	3,884	24.2
<b>Cattle:</b>						
Fat cattle -	260	2,703	1,039.6	229	675	296.5
Store cattle -	1,056	1,056	100	705	705	100
<b>Wool:</b>						
Weight in lb -	2,480,867	415,156	16.1	717,448	427,185	59.5
<b>Crops:</b>						
Grain & pulse (areas) -	Acres 6,611	-1,636	-23.9	Acres 564	-144	-25.5
Forage crops -	6,020	1,334	21.2	2,531	734	29.1
Small seeds -	8,994	-1,210	-13.4	963	-88	-9.1

## **E. THE PLAINS COUNTRY**

### **1. INTRODUCTORY DESCRIPTION**

#### **(i) Light Plainsland**

This is the extensive light sheep country of the Canterbury Plains. On average it is not suitable for grain or pulse cropping. The average annual rainfall varies between 23 and 30 inches over this area. The soils are very free draining, being five to seven inches of light grey or brown stoney or bouldery silt loam, over shingle. The soils of this group fall mainly into the Lismore and Waimakariri soil series\*.

The main areas of this class of country occur on the northern and western sections of the Culverden Plain, the Glasnevin Flats, along the northern bank of the Waimakariri between Bexley and East Eyreton, along the south bank of the Waimakariri between Kirwee and Belfast, the plains between Burnham and Darfield, and along the northern bank of the Rakaia River in the vicinity of Bankside and Te Pirita.

The total area of this country occurring in North Canterbury is 368,480 acres held in 508 holdings. Of this area 71,309 acres are held for forestry purposes, 1,415 acres are occupied by the Crown, and a further 7,645 acres are held for purposes other than agriculture. This leaves 288,110 acres in 463 holdings used for agriculture. From the survey it was found that the average size of farm was 1,328 acres, and the total number of farms was 127. The details in this report are based on records from 25 farms covering 43 holdings and 33,189 acres or 11.5 per cent of the total area.

#### **(ii) Medium-light Plainsland**

This is the lighter cropping land of Canterbury, suitable for occasional wheat and other grain or pulse crops.

\*See the extended legend accompanying the Advance Copy of the Soil Map of the Canterbury Plains and Downs.

The soil is free draining, being six to nine inches of stoney silt loam on from six to fifteen inches of yellow stoney or bouldery silt loam, over deep shingle. These soils fall mainly into the Eyre, Chertsey and Papparua soil series\*\*. The average annual rainfall over most of this country is 23 to 25 inches.

The main locations of this class of land are the Hanmer Plains, central Culverden Plain, flats west of Waiiau, the Waipara Flats and the plains between Mandeville and Oxford. The most extensive area of all is between Kirwee and Springfield.

The total area of this country in North Canterbury is 307,340 acres in 1,031 holdings. Of this area 1,669 acres are held for forestry purposes, 1,034 acres are occupied by the Crown and another 1,437 acres are held for purposes other than agriculture. From the survey it was found that the average size farm was 598 acres and the total number of farms was 507. The details in this report are based on records from 28 farms which were held in 44 holdings covering 16,755 acres or 5.5 per cent of the total area.

### **(iii) Medium-heavy Plainsland**

This is the best cropping land in Canterbury. It is suitable for the growing of any grain or pulse crop as well as carrying sheep or cattle. The average annual rainfall varies between 23 and 30 inches. The soils consist of eight to twelve inches of dark grey silt or silty clay loam, over two to four inches of light grey silt loam over mottled silt or clay. They fall mainly into the Temuka, Templeton, and Ladbrooks soil series.

The principal locations of this class of land are the Cheviot Flats, the lower Omihi Valley, the Waikari Flat, the plains between Amberley and Leithfield, the flats in the vicinity of Ohoka and Rangiora and the Ellesmere district.

\*\*From the unpublished soil map of North Canterbury by P. D. Fox and C. S. Harris of the Soil Bureau of the D.S.I.R.

The total area of this class of country occurring in North Canterbury is 174,962 acres held in 1,271 holdings. Of this area, 2,129 acres are occupied by the Crown and a further 1,375 acres held for purposes other than agriculture. From the survey it was found that the average size of farm was 270 acres and the total number of farms was 635. The details in this report are based on records from 28 farms held in 48 holdings on 7,563 acres or 4.4 per cent of the total area.

#### **(iv) Heavy Plainsland**

This is the heaviest and wettest class of country occurring in Canterbury. Cash cropping tends to be limited due to the difficulties encountered with cultivation and with weeds. This land is well suited to dairying. The soil is poorly drained being swampy in some areas, a topsoil of eight to ten inches of grey-brown silt loam lies over four to five inches of heavy grey silt loam over ironstone, or orange mottled clay. The soils of this group fall mainly into the Tai Tapu, Springston and Kaiapoi soil series\*. The average annual rainfall varies between 23 and 30 inches.

The location of the principal areas of this class of land are the Sefton swamp, a belt between Kaiapoi and Coldstream, the area around Horrelville, a belt running between Belfast and Tai Tapu, the Lincoln-Grenpark area, and sections of the Southbridge-Lakeside district.

The total area of this class of land in North Canterbury is 65,681 acres in 547 holdings. Of this area 60 acres are occupied by the Crown and a further 838 acres are held for purposes other than agriculture. From the survey it was found that the average size of farm was 210 acres and the total number of farms 307. The details in this report are based on records from 26 farms which were held in 38 holdings covering 5,474 acres or 8.4 per cent of the total area.

The remaining introductory description of the North Canterbury plainsland is summarised in Tables 22, 23 and 24 which follow:

TABLE 22  
THE TOPOGRAPHY OF THE PLAINSLAND

Topography	Light		Medium-Light		Medium-Heavy		Heavy	
	Area (Acres)	Percentage	Area (Acres)	Percentage	Area (Acres)	Percentage	Area (Acres)	Percentage
Unploughable terraces, gullies and hills - - - - -	4,340	1.5	4,978	1.6	272	0.1	—	—
Ploughable hills (with crawler) - - - - -	434	0.1	634	0.3	2,947	1.7	94	0.1
Flats and downs (with wheel) - - - - -	283,366	98.4	297,588	98.1	168,239	98.2	64,697	99.1
Total - - - - -	288,110	100.0	303,200	100.0	171,458	100.0	64,783	100.0

TABLE 23  
THE COVER SUMMARY OF THE PLAINSLAND

Type of Cover	Light		Medium-Light		Medium-Heavy		Heavy	
	Area (Acres)	Percentage	Area (Acres)	Percentage	Area (Acres)	Percentage	Area (Acres)	Percentage
Improved pasture - - - - -	146,289	50.8	193,982	64.2	105,928	61.7	39,333	60.6
Native and reverted pasture - - - - -	100,184	34.8	12,960	4.3	2,766	1.6	3,186	4.9
Scattered scrub, broom and gorse - - - - -	5,989	2.1	2,661	0.9	272	0.1	—	—
Dense and ungrazeable - - - - -	87	0.1	525	0.2	703	0.4	118	0.2
Swamp—mainly ungrazeable - - - - -	173		1,285	0.4	612	0.3	354	0.5
Fallow - - - - -	2,257	0.8	10,028	3.4	11,086	6.5	2,065	3.2
Grain and pulse crops - - - - -	6,623	2.3	24,364	7.7	31,261	18.3	16,070	24.9
Oats for chaff - - - - -	955	0.3	326	0.1	1,020	0.6	—	—
Summer forage crops - - - - -	7,699	2.7	13,683	4.6	4,738	2.8	448	0.7
Winter forage crops - - - - -	11,101	3.9	11,258	3.7	3,106	1.8	755	1.2
Lucerne - - - - -	4,687†	1.5	18,752	6.2	7,232*	4.2	1,593	2.5
Plantations, buildings, yards, waste and unproductive - - - - -	21,066	0.7	13,466	4.3	2,834	1.7	861	1.3
Total - - - - -	288,110	100.0	303,200	100.0	171,458	100.0	64,783	100.0

†1,198 acres or 25.6 per cent not saved for hay.

\*1,066 acres or 15 per cent was not saved for hay.

TABLE 24

THE DISTRIBUTION OF THE MAJOR SOIL TYPES WITHIN THE SURVEY GROUPING FOR THE FOUR  
TYPES OF PLAINSLAND

Soil Group	Group	Light		Medium-Light		Medium-Heavy		Heavy	
		Area (Acres)	Percent- age	Area (Acres)	Percent- age	Area (Acres)	Percent- age	Area (Acres)	Percent- age
Fourth-class tussock	1	—	—	—	—	—	—	—	—
Third-class tussock	2	—	—	—	—	—	—	—	—
Second-class tussock	3	—	—	—	—	—	—	—	—
First-class tussock	4	4,340	1.5	—	—	—	—	—	—
Second-class clay downs	5	—	—	—	—	—	—	—	—
First-class clay downs	6	—	—	14,661	4.8	1,814	1.0	—	—
Light plainsland	7	265,533	92.2	3,620	1.2	9,771	5.7	5,558	8.6
Medium-light plainsland	8	18,237	6.3	243,325	80.3	18,295	10.7	3,127	4.8
Medium-heavy plainsland	9	—	—	40,327	13.3	136,818	79.8	3,658	5.7
Heavy plainsland	10	—	—	1,267	0.4	4,760	2.8	52,440	80.9
Total	- - - -	<u>303,200</u>	<u>100.0</u>	<u>303,200</u>	<u>100.0</u>	<u>171,458</u>	<u>100.0</u>	<u>64,783</u>	<u>100.0</u>



## 2. FARM OUTPUT AND PERFORMANCE

A summary of farm output and performance on the plainsland is presented in the tables which follow—numbers 25 to 30.

TABLE 25

THE STOCK NUMBERS WINTERED ON THE PLAINSLAND (GROUPS 7, 8, 9 AND 10) IN THE YEAR 1953.

Class of Stock	Light Plainsland Per 1000 Acres	Per av. Farm of 1,328 acs.	Medium-light Plainsland Per 1000 Acres	Per av. Farm of 598 acs.	Medium to Heavy Plainsland Per 1000 Acres	Per av. Farm of 270 acs.	Heavy Plainsland Per 1000 Acres	Per av. Farm of 210 acs.
<b>Sheep:</b>								
Flock ewes } - -								
Stud ewes } - -	696.1	924.1	1,411	844	1,547.8	417.8	621.6	131.2
Ewe hoggets - -	118.3	157.1	260	155	155.6	42.0	83.1	17.5
Wether Hoggets - -	68.7	91.2	154	92	132.7	35.8	214.6	45.3
Ram hoggets - -	0.5	0.6	9	5	35.0	9.5	23.7	5.0
Wethers - - - -	61.1	81.2	43	26	28.0	7.5	67.9	14.3
Rams - - - -	15.5	20.6	33	20	39.4	10.6	17.8	3.8
<b>Total sheep - -</b>	<u>960.2</u>	<u>1,274.8</u>	<u>1,910</u>	<u>1,142</u>	<u>1,938.5</u>	<u>523.3</u>	<u>1,028.7</u>	<u>217.1</u>
<b>Cattle (Beef):</b>								
Breeding cows - -	0.6	0.8	3	1.8	0.1	—	—	—
Weaners - - - -	0.6	0.8	10	6.1	—	—	—	—
Yearlings - - - -	2.7	3.5	9	5.2	3.0	0.8	—	—
Two and three year dry stock - - - -	1.9	2.5	1	0.5	3.6	1.0	6.0	1.3
Bulls - - - -	—	—	0.3	0.2	—	—	—	—
<b>Total beef cattle - -</b>	<u>5.8</u>	<u>7.6</u>	<u>23.3</u>	<u>13.8</u>	<u>7.7</u>	<u>1.8</u>	<u>6.0</u>	<u>1.3</u>

TABLE 25—Continued.

Class of Stock	Light Plainsland		Medium-light Plainsland		Medium to Heavy Plainsland		Heavy Plainsland		
	Per 1000 Acres	Per av. Farm of 1,328 acs.	Per 1000 Acres	Per av. Farm of 598 acs.	Per 1000 Acres	Per av. Farm of 270 acs.	Per 1000 Acres	Per av. Farm of 210 acs.	
<b>Cattle (Dairy):</b>									
Milking cows - -	1.5	2.0	8.4	5.0	22.0	6.0	125.9	26.6	
Weaners - -	1.0	1.3	3.9	2.4	9.5	2.6	33.9	7.1	
Yearlings - -	0.8	1.0	1.0	0.6	6.5	1.7	22.4	4.7	
Two and three year dry stock - -	0.1	0.1	0.4	0.2	0.5	0.1	—	—	
Bulls - - -	0.1	0.1	0.6	0.4	1.2	0.3	4.9	1.0	
Yearlings grazed -			(0.9)	(0.5)					
Total dairy cattle -	<u>3.5</u>	<u>4.5</u>	<u>14.3</u>	<u>8.6</u>	<u>39.9</u>	<u>10.7</u>	<u>187.1</u>	<u>39.4</u>	
<b>Other Stock:</b>									
Draught horses -	0.3	0.4	0.4	0.3	1.8	0.5	1.5	0.3	
Hacks - - -	1.2	1.5	1.6	1.0	3.7	1.0	1.8	0.4	
Race horses - -	0.6	0.8			1.4	0.4			
Sows - - -			0.2	0.1	3.6	1.0	4.7	1.0	
Boars - - -			0.1		0.7	0.2	1.3	0.3	
+ Taken in as grazers (sheep) - -	96.3	127.9							

TABLE 26

THE DISTRIBUTION OF THE VARIOUS BREEDS OF SHEEP AND CATTLE ON THE PLAINSLAND FOR THE 1952-53 SEASON  
EWE BREEDS USED:

Breeds	Light Plainsland Percentage	Light-medium Plainsland Percentage	Medium-heavy Plainsland Percentage	Heavy Plainsland Percentage
Romney - - -			25.1	53.7
Half-bred - - -			64.7	31.1
Southdown (stud) -				4.4
Corriedale - - -			4.3	9.1
Ryeland (stud) -			3.3	1.7
South Suffolk (stud) -			2.6	
			<u>100.0</u>	<u>100.0</u>
<b>RAM BREEDS USED:</b>				
Southdown - - -	36.0	32.9	68.4	92.9
Border Leicester -	4.7	0.7	10.1	
Southdown x Border Leicester - - -	1.7	6.2	8.1	
English Leicester -	1.6		2.0	
Suffolk - - -		0.5	1.0	
South Suffolk - - -	1.4	13.8	1.0	
Half-bred - - -	14.0		5.4	
Romney - - -	6.4	7.5	3.3	
Corriedale - - -	32.3	37.2	0.7	
Lincoln x Border Leicester - - -		0.7		
Shropshire x South- down - - -		0.5		
Merino - - -	1.9			
Ryeland - - -				4.1
Southdown x Dorset Horn - - -				3.0
	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>
<b>BREEDS OF BULLS USED ON HEAVY PLAINSLAND COUNTRY</b>				
Friesian - - -				63.5
Jersey - - -				25.9
Ayrshire - - -				3.8
Jersey and Guernsey				3.5
Crossbred - - -				3.5
				<u>100.0</u>

TABLE 27

THE STOCK PERFORMANCE ON THE PLAINSLAND FOR THE  
1952-53 SEASON

	Light Plainsland Percentage	Medium-light Plainsland Percentage	Medium-heavy Plainsland Percentage	Heavy Plainsland Percentage
<b>Sheep:</b>				
Lambing - - -	89.9	106.6	107.7	108
Ewe death rate -	6.6	6.0	6.2	6.7
Hogget death rate -	8.2	8.1	7.1	8.3
Lamb death rate -	3.6	3.2	3.1	3.5
Ratio Rams to ewes -	1.45	1.43	1.40	1.36
<b>Cattle (Beef):</b>				
Calving - - -		74		
Cow death rate -	2	8		
Cattle to sheep ratio	1.165	1.82	1.357	1.171
<b>Cattle (Dairy):</b>				
Calving - - -	82	82.3	92	97
Cow death rate -		5.6	2.3	2.6
Calf death rate -		2.0	7.1	1.2
Cattle (dairy and beef) to sheep ratio	1.104	1.51	1.43	1.59
Ratio bulls to cows -			1.19	1.22

NOTE: Mortality rates include stock killed for meat and unaccountable losses as well as deaths.

**TABLE 28**  
**THE WOOL AND STOCK PRODUCTION FROM THE PLAINSLAND IN THE 1952-53 SEASON.**

	Light Plainsland Per 1000 Acres	Plainsland Per av. Farm of 1,378 acs.	Medium-light Per 1000 Acres	Plainsland Per av. Farm of 598 acs.	Medium-heavy Per 1000 Acres	Plainsland Per av. Farm of 270 acs.	Heavy Plainsland Per 1000 Acres	Plainsland Per av. Farm of 210 acs.
<b>Sheep:</b>								
Fat ewes - - -	87.9	116.8	160	96	363.5	98.1	170.3	35.9
Fat wethers - - -	59.7	79.3	74	44	111.3	30.1	37.9	8.0
Fat Lambs - - -	379.5	503.9	1,133	677	1,580.8	427.4	717.1	151.3
Potters - - -	3.0	4.0	14	9				
C.F.A. ewes - - -	34.8	46.2	94	56	9.9	2.7	9.1	1.9
Cull 2th ewes - - -	7.0	9.4	34	20	19.8	5.4	21.1	4.5
In-lamb ewes - - -			22	13	0.1		4.6	1.0
Store lambs - - -	59.6	79.2	19	11	27.8	7.5	14.6*	3.1
Flock rams - - -			4	2	33.1	8.9	25.5	5.4
Store wethers - - -	3.8	5.0	30	18	6.3	1.7		
<b>Wool†:</b>								
Weight in lb per acre -		6.9		15.7		16.0		6.3
Weight in lb per sheep -		7.8		8.8		9.2		8.7
<b>Cattle:</b>								
Fat cows (dairy & beef)	0.4	0.5	1.5	0.9	1.2	0.3	14.6	3.1
Fat dry cattle - - -	0.2	0.3	5.8	3.5	4.1	1.1	3.2	0.7
Weaners - - -	0.6	0.8	2.6	1.6	0.1		1.8	0.4
Store dry cattle - - -			4.3	2.6	9.0	2.4	2.5	0.5
Store cattle (dairy) - - -			0.7	0.4	2.9	0.8	6.7	1.4
Bobbies (dairy) - - -	0.5	0.6	1.3	0.7	10.8	2.9	84.7	17.9
Dairy Bulls - - -					0.1			
<b>Butterfat:</b>								
Effective milking cows -	1.2	1.6	6.9	4.1	20.5	5.5	122	25.7
Butterfat (lbs) - - -					2,917	788	14,775	7,769
<b>Pigs:</b>								
Weaners - - -			0.7	0.4	28.2		31.5	6.6
Porkers - - -	0.1	0.2	0.4	0.2	1.8		26.6	5.6
Baconers - - -	0.1	0.1	4.4	2.6	12.6		42.8	9.0
Baconers for own use -			0.2	0.1	0.7	0.2	0.4	0.1

\*One-third of these sold with ewes all counted.

†Does not include allowance for or actual lambs' wool shorn.

TABLE 29

THE DISTRIBUTION OF CROPS AND THE CROP OUTPUT FROM THE PLAINSLAND FOR THE SEASON 1952-53. (This season was exceptionally wet, and yields on heavy plainsland have been seriously affected.)

Crop	Light Plainsland		Medium-light Plainsland		Medium-heavy Plainsland		Heavy Plainsland	
	Area per av. Farm in acres	Av. yields per acre	Area per av. Farm in acres	Av. yields per acre	Area per av. Farm in acres	Av. yields per acre	Area per av. Farm in acres	Av. yields per acre
<b>Feed Crops:</b>								
Summer forage crop	35.5		27.0		7.5		1.5	
Winter forage crop -	50.7		22.2		4.9		2.5	
Green feed - -	21.0		13.5		9.9		1.8	
Oats for chaff - -	4.4	1½ tons	0.6	1.6 tons	2.3	2 tons	—	
Lucerne hay - -	16.1	96.2 bales	28.3	98 bales	9.7	106 bales	4.9	143 bales
Meadow hay - -	9.0	51.1 bales	22.0	55 bales	11.4	78 bales	19.9	93 bales
Silage - - -	0.6	4½ tons	5.4	1.6 tons			0.7	
New grass - - -	27.8		17.7		15.3		13.2	
New lucerne - -	1.2		2.7		0.4			
New grass undersown	61.3		32.4		2.4		3.0	
<b>Small Seeds:</b>								
		M.D. Basis		M.D.		M.D.		M.D.
Perennial ryegrass -	10.2	18.0	11.2	18 bush.	4.4	18.1 bush.	2.4	29.6 bush.
H1 ryegrass - - -	1.4	23.4	2.2	30 bush.	1.6	35.6 bush.	2.0	33.1 bush.
Italian ryegrass -					2.9	29.8 bush.	1.8	27.4 bush.
White clover - - -	3.2	140 lb	20.9	119 lb	8.4	139.4 lb	5.7	102.7 lb
Red clover - - -	2.8	199 lb	6.2	74 lb	2.6	87.6 lb	1.5	98.0 lb
Timothy - - -					0.4	220 lb		
(Lucerne) - - -	(0.5)		(3.5)		(1.1)	99 lb		
Cocksfoot - - -			1.1	85 lb				
Browntop - - -	1.2	16.8 lb						
Total small seeds -	18.8		41.6		20.3		13.4	
<b>Grain and Pulse Crops:</b>								
Wheat - - -	9.8	29.1 bush.	23.6	32 bush.	22.2	35 bush.	21.0	32 bush.
Barley - - -	10.8	30.6 bush.	12.4	59 bush.	8.6	55 bush.	16.9	60 bush.
Garden peas - - -			0.6	34 bush.	3.1	26 bush.	6.4	33 bush.
Patridge peas - -			1.3	20 bush.	2.0	33 bush.	4.9	27 bush.
Potatoes - - -	0.3	5.1 tons		6.2 tons	3.1	9 tons	13	3.5 tons
Oats - - -	7.6	39.8 bush.	5.6	64 bush.	9.0	66.8 bush.	1.8	33.2 bush.
Ryecorn - - -			0.3	16 bush.	0.8	25 bush.		
Lupins - - -	2.0	12.0 bush.			0.5			
Linseed - - -			2.4	.7 tons				
Total grain and pulse crops - - -	30.5		47.8		49.3		52.3	

### 3. PRESENT PRODUCTION AND POTENTIAL FOR THE FUTURE

A summary of the present stock numbers and the anticipated increase at the end of ten years is presented in Table 30. Table 31 covers the output or sales of stock and crops from the plainsland at present and the estimated improvement at the end of ten years.

TABLE 30  
THE 1952-53 STOCK NUMBERS ON THE PLAINSLAND AND THE ANTICIPATED INCREASE AT THE END OF TEN YEARS.

Class of Stock	Light Plainsland			Medium-light Plainsland			Medium-heavy Plainsland			Heavy Plainsland		
	Present numbers	Increased numbers	Per cent increase	Present numbers	Increased numbers	Per cent increase	Present numbers	Increased numbers	Per cent increase	Present numbers	Increased numbers	Per cent increase
<b>SHEEP:</b>												
Flock ewes - -	200,197	60,517	30.2	420,137	51,893	12.1	252,385	16,300	6.1	36,167	8,520	21.2
Stud ewes - -	347			7,711			12,990			4,106		
Ewe hoggets - -	34,086	24,547	72.0	78,807	34,499	43.8	26,683	2,448	9.2	5,381	402	7.5
Wether hoggets - -	19,799	-8,610	-43.5	46,789	-16,182	-134.6	22,761	-9,046	-39.7	13,900	-10,242	-73.7
Ram hoggets - -	130	-	-	2,751			6,005	-791	-13.2	1,534	-	-
Wethers - -	17,612	-9,540	-54.2	13,104	-5,303	-40.5	4,806	-3,604	-74.9	4,401	-2,395	-54.4
Rams - -	4,479	1,491	32.2	9,995	941	9.5	6,756	381	5.6	1,156	154	13.3
Total sheep - -	276,640	68,405	24.7	579,254	65,848	11.4	332,386	5,688	1.7	66,645	-3,562	-5.3
<b>CATTLE (BEEF):</b>												
Breeding cows - -	174	352	219.5	905	1,321	145.9	23	-	-	-	-	-
Dry cattle - -	1,502	-9	-0.6	6,137	777	12.7	907	1,450	155.9	389	2,148	552.2
Total beef cattle - -	1,676	371	22.1	7,042	2,098	29.8	930	1,450	155.9	389	2,148	552.2
<b>CATTLE (DAIRY):</b>												
Milking cows - -	443	17	3.8	2,552	-289	-11.3	3,809	204	5.4	8,154	247	3.0
Dry stock - -	547	-171	-31.2	1,793	-870	-48.5	3,038	340	11.2	2,782	1,254	45.1
Total dairy cattle - -	990	-154	-15.5	4,345	-1,159	-26.7	6,847	544	7.9	10,936	1,501	13.7
<b>PIGS:</b>												
Sows - - -				72			612	45	7.4	307	12	3.9
Boars - - -				36			113	8	7.1	83		

**TABLE 31**  
**THE OUTPUT OF STOCK AND CROPS FROM THE PLAINSLAND IN 1952-53 AND THE ANTICIPATED**  
**INCREASE AT THE END OF TEN YEARS.**

Product	Light Plainsland			Medium-light Plainsland			Medium-heavy Plainsland			Heavy Plainsland		
	Present totals	Increased numbers	Per cent increase	Present totals	Increased numbers	Per cent increase	Present totals	Increased numbers	Per cent increase	Present totals	Increased numbers	Per cent increase
<b>SHEEP:</b>												
Fat ewes - -	25,346	11,674	46	48,544	20,146	41.5	62,320	11,470	18.4	11,033	6,549	59.4
Fat wethers -	17,212	-13,809	-80.2	22,408	14,516	64.7	19,088	295	1.5	2,454	1,184	48.2
Fat lambs - -	109,351	26,249	24.0	343,429	45,793	13.3	271,043	24,596	9.0	46,457	6,879	14.8
Potters - -	868			4,344								
C.F.A. ewes -	10,034	6,675	66.5	28,417	2,444	-6.2	1,700	-1,700	-100			
Cull 2th ewes -	2,031	4,305	211.9	9,973	6,769	67.9	3,400	-1,133	-33.3	590		
In-lamb ewes -				6,607						1,664	-1,664	-100
Store lambs -	17,178	8,350	48.6	5,756	-5,756	-100.0	4,761	-4,761	-100	944	-944	-100
Flock rams - -				1,122			5,668	-907	-16.0	1,652		
Store wethers -	1,085	5,382	496.0	9,122	-9,122	-100.0	1,088	-1,088	-100.0			
Ram lambs -							13					
<b>WOOL:</b>												
Weight in lb -	1,997,068	580,634	29.1	4,772,680	863,822	18.4	2,735,294	32,811	1.2	407,100	77,446	19.0
<b>BUTTERFAT:</b>												
Weight in lb -							500,078			957,154	10,620†	4.5
<b>CATTLE:</b>												
Fat cattle - -	165	1,093	662	2,207	1,341	55.0	907	1,655	182.5	1,158	2,336	201.7
Store cattle -	304	260	149.4	2,679	-869	-37.8	3,944	-1,586	-75.9	6,207	176	24.4
WHEAT (bushels) -	62,192	-23,826	-38.3	385,892	-8,425	-2.2	484,163	123,393	25.5	202,500	26,715*	13.2
<b>SMALL SEEDS</b>												
(sacks) - -											1,150	6.0
Total grain and pulse crops (sacks) -											-22,400	-10

†This increase is based on the total butterfat production from the Group, i.e., it includes Town Supply farms.

\*This increase in wheat yield in spite of the decrease in area is due to the low yield in 1952-53, and on average there would be a reduction of approximately 25 per cent.



## SUMMARY AND CONCLUSIONS

### The Present Production

This survey has shown that there is a large variation in output between the various classes of land.

### The Tussock Country

The carrying capacity varies between 4/10ths of a sheep, including  $\frac{1}{4}$  of a ewe per acre, on the Third-class tussock to 1 sheep per acre including 7/10ths of a ewe on the First-class tussock. Similarly lambing percentage varies from 70 to 91 per cent. and wool weight per acre from 2.75 lb. to 8.3 lb. While sheep breeds are all predominantly fine wool an interesting change takes place as the country improves with Half-breds losing ground to Corriedales. Other breeds while still minor are assuming much more importance. While no doubt performing a useful function in land improvement cattle are not present in large numbers, varying from eight per 1000 acres on the Third-class to 33 on the First-class. Cropping is of only minor importance. While very rare on the hardest country it increases considerably on the First-class tussock.

### The Clay Downs

The Second-class downs carries only 1.1 sheep per acre including just over  $\frac{3}{4}$  of a ewe, while the First-class downs carries just double these numbers. Lambing percentage rises from just under 95 on the Second-class to just under 105 on the First-class. Rather surprisingly beef cattle are not yet of much importance on North Canterbury clay downs, carrying from only 13 per 1000 acres to 18 per 1000 acres. While there is some dairying it is unimportant, being equivalent to only 1 lb. butterfat per acre in the First-class and less in the Second-class downs. Cash cropping is not important on the Second-class downs totalling only 17 acres of cash crops and small seeds per 1000 acres. On First-class downs it is important, totalling 120 acres per 1000 acres with small seeds somewhat more important than cash cropping. Feed crops are quite important on the Second-class downs occupying, including hay area, about 75 acres per 1000 acres. On First-class downs these are 125 acres with again a significant portion of this devoted to hay.

### The Plainsland

Just under 1 sheep per acre is carried on the light-plains including nearly 7/10ths of a ewe. About twice this number is carried on the medium-light with much the same on the medium-heavy, although there are slightly more breeding ewes. Heavy plainsland carries only 1 sheep per

acre including 6/10ths of a breeding ewe. The wool weight per acre varies from just under 7 lb. on the light plainsland up to about 16 lb. in the medium-light and medium-heavy country back to just over 6 lb. in the heavy plainsland.

Beef cattle are relatively unimportant on the light plainsland, being carried only at the low level of 6 per 1000 acres. There is a considerable rise to 23 per 1000 acres again on the medium-light falling to only 6 per 1000 acres again on the medium-heavy and heavy plainsland. Dairying is confined to the few house cows on the light plainsland. While relatively unimportant on the medium-light land there is a rise of 40 per 1000 acres on the medium-heavy. There is considerable dairying on the heavy plainsland with total dairy cows at 18.7 per 1000 acres and a production of about 35 lb. of butterfat per acre.

The study of the breeds of ram used reveals interesting trends. On the light plainsland fat lamb sires are mainly Southdowns and comprise less than 40 per cent. of the rams used. There is a slight rise in the proportion of fat lamb sires in the medium-light group with a swing away from Southdowns to the heavier breeds and their crosses. There is a pronounced swing to the fat lamb sire with 70 per cent. of Southdowns and a further 20 per cent. of other fat lamb breeds on the medium-heavy land while the heavy group uses 100 per cent. of fat lamb sires. Romneys are not popular in North Canterbury and account for only five to seven per cent. of the rams used. Most of the breeding of replacements is by fine-woolled rams—mainly Corriedale on the medium-light, but with a fair proportion of Half-bred on the light plainsland.

Cash cropping with grain and pulse crops plays only a small part on the light plainsland, accounting for only 23 acres odd per 1000 acres. It is of more importance on the medium-light group with 80 odd acres and reaches a high level of 190 acres on the medium-heavy and a peak of 250 acres per 1000 acres on the heavy plainsland group. Apart from the light group yields do not differ as much as would be expected. Small seeds are not grown to any extent on the light group accounting for only 15 acres per 1000 acres of land—there is a sharp rise to 70 acres per 1000 acres on the medium-light group with much the same area on the medium-heavy and heavy groups.

Feed crops are fairly extensive on the light plainsland accounting for about 150 acres per 1000 acres when new grass and hay areas are included. This area is even higher on the medium-light ground rising to 280 acres per 1000 but falling to 220 acres per 1000 on the medium-heavy and heavy groups.

## **The Potential**

The increases in production at the end of a ten year period in North Canterbury vary a great deal with the class of land and the nature of the product.

## **The Tussock Country**

In the absence of still more favourable price and cost relationships and the development of special light-weight fertilizers there seems little prospect of increases in output from the high country or Fourth-class tussock. Anticipated changes in the Third-class tussock are relatively small, being of the order of less than 10 per cent. for sheep, but 75 per cent. for cattle. There is a significant increase of 22 per cent. in total sheep and breeding ewes expected on the Second-class country based mainly on aerial sowing of grass and clover seeds together with appropriate fencing. The rise expected in beef cattle is of the order of 80 per cent. Cropping does not play a large part on this class of land but the small areas of grain and pulse crops for cash are reduced substantially. This has been associated with important increases in feed crops especially lucerne. It is somewhat surprising that although the same pattern of increases is anticipated on the First-class tussock the amount of these increases is considerably less, especially in beef cattle.

## **The Clay Downs**

On the First-class clay downs increases of the order of 13 to 14 per cent. in total sheep and breeding ewes are anticipated with rather more in ewe hoggets and a decrease in the number of wethers and wether hoggets. Beef cattle are expected to increase 100 per cent. Cash crops and small seeds will be reduced appreciably but 20 per cent. more sheep feed crops will provide for the increased stock numbers.

On the Second-class clay downs pronounced increases of the order of over 40 per cent. are expected in sheep numbers and breeding ewes while 200 per cent. increases in beef cattle numbers are forecast. Reductions are expected in grain, pulse and small seeds cropping but these will be offset by large increases in greenfeeds, forage and lucerne.

Increases in output from clay downs are based on general improvements in management, but increased tonnages of lime and super are important features.

## **The Plainsland**

Light plainsland farmers expect to increase their sheep numbers and breeding ewes by 25 to 30 per cent. with some associated reductions in wethers and wether hoggets. The