RECENT TRENDS IN LAND USE ON SOUTH-WESTERN WHEAT FARMS.*

by

Ross Parish,

Assistant Economics Research Officer.

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† 5071—3

During the winter of 1951, the Division of Marketing and Agricultural Economics carried out a land-use survey on wheat farms in a selected area of the South-west Slopes and Eastern Riverina. The aims of the survey were to investigate farming methods currently employed on wheat farms, changes in farm practices over the years, and the reasons for such changes as have occurred. Information concerning these matters was obtained by interviewing a number of wheat-farmers residing in the survey area; a standard schedule of questions was asked of each farmer.

1. THE SURVEY AREA.

It was decided to conduct the survey in an area of the Southern wheat belt that is seriously infested with skeleton weed, since it is known that this weed has had considerable influence on farming methods. The following ridings were selected for survey: A and C ridings of the shire of Mitchell, B and C ridings of the shire of Coolamon, and A riding of the shire of Illabo. These ridings embrace an area lying to the north and west of the city of Wagga Wagga, bounded on the south by the Murrumbidgee River, on the east by (roughly) the Wagga-Junee railway line, extending as far west as the town of Matong, and as far north as the Methul and Rannock localities. The whole area is bisected from east to west by the South-west railway line, along which are situated the towns of Marrar, Coolamon, Ganmain and Matong. Mitchell and Illabo shires are included in the statistical division of South-west Slopes, while Coolamon shire lies within the Riverina division.

The main topographical features of the area are shown on the map accompanying this report (Fig. I). It will be seen that whereas the western portion of the area is mainly level to undulating, the eastern

TABLE I.

Average Annual Rainfall for Selected Stations Within, and Adjacent to, the Survey Area.

(Stations arranged in order of location from South-East to North-West).

Name of Station.	Location.	Average Annual Rainfall.	Number of Years for which Records Are Available.*
		Inches.	Years.
Wantabadgery	South-east of Survey Area ...	21.34	62
Illabo...	East of Survey Area	20.34	18
Wagga Wagga	South-eastern edge of Survey Area.	21.29	73
Wagga Agricultural College		20.10	32
Junee Junction	Eastern edge of Survey Area ...	20.80	41
Junee Post Office		20.51	53
Rockview	Illabo A	20.25	49
Marrar	Coolamon C	19.86	57
Coolamon	Approximately Centre of Area...	19·9	57
Berry Jerry	Coolamon C	19.16	13
Ganmain	Coolamon B	17.89	30
Bulls Run	Mitchell A	18.49	60
Dulla Dulla	Coolamon B	18.05	46
Grong Grong	West of Survey Area	17.22	46
Cowabbie	North-west of Survey Area ...	16.51	47

* Rainfall records up to and including 1944.

Source: "Results of Rainfall Observations made in New South Wales," Section V. Commonwealth of Australia, Bureau of Meteorology, 1948.

TABLE II.

Average Monthly and Annual Rainfall for Selected Stations Within, and Adjacent to, the Survey Area.
(Inches.)

Station.	Number of years on which Record Based.	Month.												Year.
		Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	
Wagga Wagga...	73	1.48	1.47	1.66	1.65	1.85	2.58	1.83	2.01	1.75	2.02	1.55	1.40	21.29
Junee	53	1.41	1.38	1.58	1.70	1.69	2.30	1.86	1.96	1.68	1.87	1.58	1.49	20.51
Ganmain ...	28	1.52	1.12	1.64	1.43	1.36	2.22	1.71	1.64	1.48	1.62	1.33	1.09	18.16
Bull's Run Station ...	60	1.65	1.35	1.44	1.45	1.53	2.11	1.63	1.69	1.41	1.77	1.27	1.19	18.49
Grong Grong ...	46	1.38	1.20	1.34	1.30	1.44	2.00	1.54	1.64	1.37	1.65	1.19	1.17	17.22

Source : " Results of Rainfall Observations made in New South Wales," Section V. Commonwealth of Australia, Bureau of Meteorology, 1948.

section is hillier and more elevated. This elevated area surrounds a fairly distinct range of hills—the Malebo Range—which lies along the western boundaries of Mitchell C and Illabo A ridings and the eastern edge of Coolamon C riding.

The soils of the area are for the most part red-brown loams, but patches of heavier, darker soils occur in the westerly part of the area. Skeleton weed thrives on the light soils, but does not establish itself on these heavier soils.

The mean annual rainfall for selected stations within, and adjacent to, the survey area is set out in Table I. In the table these stations have been arranged in order of location from south-east to north-west. The location of these stations is shown on the accompanying map (Fig. I) on which the 20 inch, 18 inch and 16 inch isohyets are also sketched. It will be seen that the rainfall decreases from an average of slightly more than 20 inches per annum in the south-east of the area to a yearly average of 16 inches in the north-west corner. The greater part of the area receives an average annual rainfall in excess of 18 inches.

Maximum rainfall is received in the winter months, and the area is liable to summer droughts. The average monthly rainfall figures for selected stations are shown in Table II. These data show that rainfall is fairly smoothly distributed about a winter maximum occurring in June except for something of a subsidiary maximum in October.

Rainfall in Relation to Land Use.

The whole of the survey area is climatically suitable for economic wheat production. However, in the south-east corner, where the terrain is more rugged and where excessive rainfall and cold spring weather present difficulties in some seasons, grazing displaces wheat growing as the dominant activity. East of the survey area, too, sheep raising is the most important enterprise. In fact, the eastern boundary of the area approximates to the inner margin of the wheat belt.

Wheat seeding takes place in April and May and is usually timed to follow a period of rainy weather so that sufficient moisture will be available for a satisfactory germination. The estimated "optimum" rainfall requirements of the wheat crop during the growing season are set out along the top of Table III, which shows the percentage chance of these optimum amounts being received at selected stations. An examination of this table, in conjunction with Table II, which shows the average monthly rainfall at the same stations, reveals the general suitability of the area for wheat growing.

Rainfall, both in respect of its total amount and its distribution, has certain specific limiting effects on the type of farming that can be carried out in the area. Over the greater part of the survey area, wheat is usually sown on fallow ground, i.e. land that has been broken up six to nine months previous to sowing, and, in the interim, kept reasonably free of weeds by grazing and further cultivations. Fallowing or "dry farming" as it used to be called, is designed to conserve in the soil as much as possible of the rain which falls during the spring and summer months, to accelerate the accumulation of nitrate nitrogen, to reduce weed competition and to promote tilth and a firm seed bed

TABLE III.

Monthly Rainfall Probability.

Station.	Percentage Chance of Receiving Specified Amount or More.						
	April, 1½ in.	May, 1½ in.	June, 1½ in.	July, 1½ in.	Aug., 1¾ in.	Sept., 1½ in.	Oct., 1½ in.
Wagga Wagga...	45	50	74	56	55	59	62
Junee	45	38	72	56	56	49	63
Ganmain ...	40	34	69	50	46	35	46
Bulls Run ...	38	40	72	47	46	40	51
Grong Grong ...	33	35	62	46	45	33	51

Source: Commonwealth of Australia, Commonwealth Meterological Bureau. Studies in applied Climatology, New South Wales—Pamphlet No. 2, 1947: "Climate of the South-West Wheat Belt of New South Wales with special reference to the Rainfall over marginal areas", by C. E. Hounam, B.Sc.

for the crop. Experiments have shown that fallowing increases the wheat yield. The almost universal adoption of this practice in the survey area is due to the fact that rainfall during the summer months is rather light and unreliable. On the eastern fringe of the area, and further eastward, however, fallowing is not the usual practice. Here, the higher and more reliable rainfall makes fallowing of doubtful value, and satisfactory crops can be grown on land the preparation of which is not commenced until late summer.

Rainfall also limits the types of pasture improvement that can be undertaken in different parts of the area. Subterranean clover (*Trifolium subterraneum*), a winter and spring-growing annual, is a most valuable introduced pasture species, which, when green, provides an excellent feed for sheep and, when it has died off, leaves a considerable residue of protein-rich seeds, which provide feed for sheep in the dry summer months. It is the setting of this seed which ensures the regeneration of the clover the following year. If sufficient rain falls during the seed-setting period in spring, subterranean clover becomes, in effect, a perennial pasture species. The margin for the successful establishment of subterranean clover pastures is therefore determined by the extent and reliability of the spring rainfall.

In the south-west, the margin for the successful establishment of early strain subterranean clover has been observed to correspond with the 18 inches annual rainfall isohyet. The greater part of the survey area receives an average annual rainfall of 18 inches or more, and subterranean clover is being sown throughout this portion of the area. Where the average rainfall exceeds 19½ inches per year, the mid-season strain of subterranean clover can be established: one farmer interviewed in the Marrar district has sown this strain.

To the west and north-west, however, where the rainfall is less than 18 inches, pasture improvement is limited to the sowing of Wimmera rye grass (*Lolium rigidum*) and grazing lucerne—the latter can be successfully grown in areas receiving an average annual rainfall of 17 inches or more—and the encouragement of the naturally occurring legumes, of which ball clover (*Trifolium glomeratum*) is the most valuable.

2. SELECTION OF THE SURVEY FARMS.

All adults residing in the survey area are listed in the Shire Electoral Rolls, which are made out by ridings. The names and addresses of all persons whose occupation was given as "farmer" were obtained from these rolls. "Farmers", whose name also appeared in the electoral roll of wheatgrowers compiled under the Wheat Industry Stabilisation Act of 1948, were deemed to be "wheat farmers". Seven hundred and forty-one "wheat farmers", so defined, were found to reside in the five selected ridings, and these constituted the "population" from which the sample was drawn.

An "original" sample of one in nine (11.1 per cent.) was systematically selected from the alphabetically listed "population" of each of the five ridings. The point at which selection began, in each riding, was determined by random numbers. For each riding a "replacement" sample of one in fifteen (6.7 per cent.) was selected in a similar manner to the original sample, from the population that remained after the original sample had been selected. In cases of non-response on the part of farmers included in the original sample, the size of this sample was maintained by substituting farmers from the replacement sample. The order in which replacements were to be substituted in the original sample was determined by random numbers. Table IV

TABLE IV.

Numbers of Farmers Selected for Interview, Compared with the Total Number of Wheat Farmers Residing in each Riding.

Shire.		Coolamon.		Mitchell.		Illabo.	Whole Area.
Riding.		B.	C.	A.	C.	A.	
Population (No. of resident wheat farmers)		214	203	146	76	102	741
Theoretical ... ... Samples	Original Sample	23	23	16	9	12	83
	Replacement Sample	13	12	8	5	6	44
Actual ... ... Sample	"Original" Farmers	16	20	12	5	8	61
	"Replacement" Farmers ...	6	5	5	4	3	23
	Total Sample	22	25	17	9	11	84
Sampling Fraction (per cent.)*		10.3	12.3	11.6	11.8	10.8	11.3
Non-Response (per cent.)†		27.3	20.0	29.4	44.4	27.3	27.4

* Proportion of the population included in the total sample.

† Proportion of "Replacement" farmers in the total sample.

shows, for each riding, the size of the population, the theoretical samples selected and the size and composition of the actual sample interviewed.

The sampling method automatically excluded all persons who have commenced wheat-farming since 1948, the date when the wheat electoral roll was compiled. But since the aim of the survey was to collect data from each farm covering a reasonable period of years, newly-established farmers would have been excluded in the field in any case.

Although sampling aimed at selecting a sample of *farmers,* the main purpose of the survey was to discover how land was being utilized on *farms* in the area. Hence, a sample drawn from a "population"

of farms would have been logically more satisfactory. The fact that the survey was, in part, concerned with *farmers'* attitudes to various questions in no way impugns this conclusion, since the attitudes and opinions that are of interest are those held by *farm operators,* i.e., persons responsible for making the managerial and entrepreneurial decisions on farms. Normally, these functions are vested in one individual.[1] Thus, for the purposes of the survey, a sample of farms or of farm operators would be equally appropriate since they would amount to the same thing.

The rule was adopted that the selection of the sample of farmers was to be regarded as an indirect means of selecting a sample of farms or of farm operators. Consequently, when a selected farmer was found to be a junior partner in a family farm (e.g., the son of the operator) the senior partner was interviewed, where this was practicable. In this report, reference will be made to "the sample of farms" or "the sample of farmers" (i.e., farm operators) depending on the type of data being analysed.

This indirect method of selecting a sample of farms, or farm operators, by choosing farmers' names at random from electoral rolls introduces a bias in favour of farms employing larger than average numbers of farmers, since the chances of a farm being selected are in proportion to the number of persons (over the age of 21 years) employed on it. Since the area of farms was found, on the average, to be roughly proportional to the number of persons employed (see Table IX) the sampling method was biassed in favour of larger-than-average sized farms.

3. LIMITATIONS OF THE FIELD SURVEY METHOD.

The quantity and type of information that can be obtained by field interviews with farmers is limited by several circumstances. In the first place, attempts to obtain data on matters which the farmer regards as private (e.g., his net income) are liable to arouse his antagonism and jeopardize the chances of securing information on other, less personal, matters. If the type of data sought necessitates recourse to farm records, the percentage response is likely to be smaller than if the information could be supplied from memory since few farmers keep adequate records. The number of questions that can be asked, and the attention with which the farmer answers them, depends on the time that the farmer is willing to devote to the interview, and this is likely to vary considerably from farmer to farmer.

In view of these considerations, no information on income or expenditure was sought, although a knowledge of the financial situation of farmers would have been valuable in interpretating other information obtained. The questions asked were all of the type that most farmers could answer from memory. The questionnaire sought a certain minimum amount of data—mainly concerning the current situation on farms —which it was expected all farmers could supply, and, in addition, provision was made for recording an indefinite quantity of information concerning the situation in earlier years.

[1] Partnerships present no difficulties, since, if a difference of opinion exists a compromise solution must be found, and the compromise can be regarded as the opinion of the "operator."

The variation in the quantity of historical information yielded by different interviews—due to the fact that some farmers had better memories and/or had occupied their farms for longer periods than others—creates difficulties in its presentation. In general, when changes in a variable over time are discussed in this article only directly comparable data will be set out for comparison, e.g., if it desired to present data on the area sown to crop in the years 1948-49-50-51, the data will be compiled only from the records of farmers supplying this information for *all* four years, even though more farmers supplied information for the more recent years than for the whole period. To make maximum use of the available data, information will frequently be presented for various time-periods, e.g., 1948-51, 1949-51, 1950-51, each series being compiled from the records of farmers supplying the information for all years included in each period.

4. THE SURVEY FARMS.

Most wheat farms in the southern wheat belt were established during the rapid expansion of the industry which occurred between 1890 and 1930. During this phase of pioneer settlement, when considerable areas had to be cleared of timber before they could be cultivated, the majority of holdings were fairly small, many being between 400 and 600 acres. The policy of closer and soldier settlement authorities—which were responsible for the establishment of many of the farms—was, at the time, to settle farmers on "home maintenance" or "living areas." In non-marginal areas it was considered that an area of approximately one square mile (640 acres) was large enough to support a farm family at a reasonable standard of living. With the farming techniques of the period—when horses provided the only source of power on most farms—this area approximated to the area that a man could farm without employing non-family labour on a permanent basis.

Changes in Farm Size.

During the last two decades several factors have favoured the aggregation of small farms into larger holdings.

1. At the low wheat prices which prevailed during the 'thirties, the income-earning capacity of these small farms was reduced to a very low level.[2]

2. The replacement of horses by tractors, which proceeded throughout the 'thirties and the post-war period and which is now virtually complete, has considerably increased the efficiency of labour used in fallowing, sowing and harvesting operations. Consequently, family labour is now capable of handling a much greater area of crops than previously. For the efficient employment of that labour, larger farms are necessary.

3. More diversified farming methods, involving wider crop rotations and a greater emphasis on sheep raising, have gradually found favour among wheat farmers in the area. This has also increased the ratio of land to labour required for efficient farming.

4. During the past ten to fifteen years many second generation wheat farmers have commenced farming on their own account. There is a tendency for the sons of the original settlers to acquire properties adjacent, or close, to the home farm, and frequently the management

[2] High wool and wheat prices in recent years have had the opposite effect; they have enabled small and inefficient farms to provide adequate incomes for their operators.

of the two properties is integrated to a greater or less degree. Where the degree of integration is high, the two properties are best treated as constituting a single farm. The area that constituted "a survey farm" was defined by these functional considerations, and not by the legal ownership of particular blocks of land.

Data collected from survey farmers concerning changes in the area of their farms is summarized in Tables V and VI. Table V is represented diagrammatically in Fig. II. It will be seen that the proportion of farms in the larger area groups and the average area of farms have both increased considerably. This indicates that quite a number of small properties have been aggregated to form larger farms. Nevertheless, the most characteristic size is still between 600 and 700 acres, and more than half the farms are less than 1,000 acres[3] in area (see Table VII). Despite the aggregation that has occurred, the original pattern of settlement persists to a considerable degree. It is to be expected, of course, that farm size would respond to economic pressures only in a slow and imperfect manner.

Statistics for the police patrol districts of Coolamon and Ganmain also reveal that the average area of holdings has increased (see Table VIII), but not to the extent suggested by the survey data.

TABLE V.

Proportion of Farms in Various Size Groups in Selected Years.

Year.	Area Class (Acres).								
	200 to 399.	400 to 599.	600 to 799.	800 to 999.	1,000 to 1,199.	1,200 to 1,399.	1,400 to 1,999.	2,000 and greater.	Total.
	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.
1920	3.7	33.3	44.5	11.1	3.7	3.7	0.0	0.0	100.0
1930	3.8	19.2	38.6	15.4	9.6	3.8	9.6	0.0	100.0
1940	3.1	16.9	36.9	12.3	9.2	10.8	10.8	0.0	100.0
1951	0.0	11.9	27.4	16.7	14.3	8.3	13.1	8.3	100.0

TABLE VI.

Aggregation of Holdings.

Average Area of Survey Farms in Selected Years.

Number of Farms for which Continuous Records Are Available.	Average Area of Holdings in—			
	1920.	1930.	1940.	1951.
	acres.	acres.	acres.	acres.
28	637	766	873	1,192
52	.....	795	860	1,189
65	.....	.....	854	1,128
84	.....	.....	.....	1,101

[3] This figure is of some significance, since, in the area under consideration, it has been the policy of soldier settlement authorities in recent years to establish farmers on areas of at least 1,000 acres.

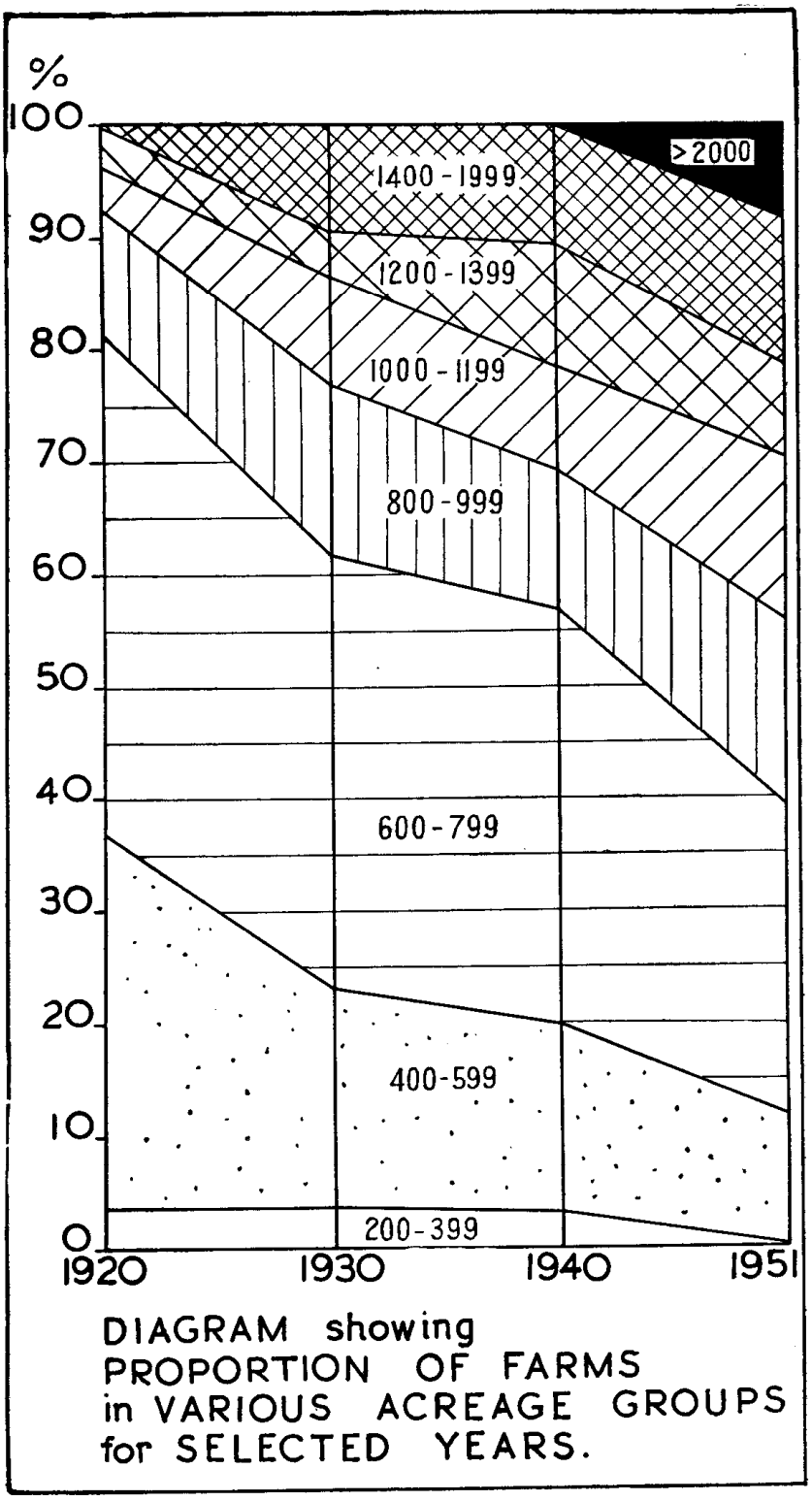
%
100
90
80
70
60
50
40
30
20
10
0
1920
1930
1940
1951
>2000
1400 - 1999
1200 - 1399
1000 - 1199
800 - 999
600 - 799
400-599
200-399
DIAGRAM showing
PROPORTION OF FARMS
in VARIOUS ACREAGE GROUPS
for SELECTED YEARS.

Fig. II.

TABLE VII.

Size of Survey Farms.

Distribution by Area Classes.

Area Class (acres).	400 to 599.	600 to 799.	800 to 999.	1,000 to 1,199.	1,200 to 1,399.	1,400 to 1,599.	1,600 to 1,799.	1,800 to 1,999.	2,000 to 2,999.	Greater than 3,000.	Total.
Number of Farms ...	10	23	14	12	7	2	5	4	6	1	84
Percentage of Farms	11.9	27.4	16.7	14.3	8.3	2.4	6.0	4.7	7.1	1.2	100.0
Cumulative percentages	11.9	39.3	56.0	70.3	78.6	81.0	87.0	91.7	98.8	100.0	...

TABLE VIII.

Average Area of all Holdings in Selected Years.

Police Patrol District.	Average Area of Holdings in—			
	1920.	1930.	1940.	1951.
	acres.	acres.	acres.	acres.
Coolamon	744	735	800	828
Ganmain	825	895	948	1,025

In comparing the two sets of data it should be borne in mind that the former refers to all holdings in the district, so that an increase in the average area of wheat farms could be obscured by the subdivision of grazing properties and/or an increase in the number of small mixed or dairy farms in favoured localities. Furthermore, police patrol statistics are probably based on a legal definition of a holding and not on the functional definition adopted on the survey.

Labour Employed on Farms.

Wheat farms are, typically, family farms, i.e., farms on which the greater part of the work is carried out by the operator and members of his family. In 1951, 144 adult[4] males were employed on a permanent basis on the eighty-four survey farms. Of these, 137 were farm operators or members of their families, and seven were hired men (three of these seven hired labourers were employed on the one farm, which was the only farm on which hired labour constituted the bulk of the labour force). In addition, seven junior males, members of operators' families, were permanently employed. Five men were employed on a part-time basis; only one of these was a hired man.

Most farmers supplement their labour force at hay-cutting, harvesting and shearing time by employing casual or contract labour. Such seasonal labour has not been included in the part-time labour mentioned above.

[4] An adult was defined as a person of eighteen years or over.

Relation between Farm Size and Labour Employed.

Farms have been classified, in Table IX, as "one-man," "two-men" and "three or four-men" farms. For the purposes of this classification,

TABLE IX.

Relation between Area and Labour Force Employed on Survey Farms, 1951.

Number of Men Permanently Employed per Farm.	Number of Farms—			Average Area of Farms.
	Less than 1,000 acres.	1,000 to 2,000 acres.	Greater than 2,000 acres.	
				acres.
1	27	7	0	771.5
2	18	18	5	1,152.2
3 or 4	0	3	4	1,941.2

a "man," or one labour unit, was defined as an adult male permanently employed. Junior males were counted as the equivalent of half a labour unit, and part-time labour was counted as fractions of a labour unit in proportion to the number of weeks worked per annum.

As would be expected, the average area of farms increases as their labour force becomes greater. The average areas of one, two and more-than-two-men farms were found, on analysis, to differ significantly, each from the other. ($P = 0.05$.)

TABLE X.

Area Occupied under Various Tenure Arrangements, Survey Farms, 1951.

Tenure.	Area.	Percentage of Total Area.	
	acres.	per cent.	
Crown Tenures—			
Freehold	59,152	63.9	
Lease in Perpetuity ...	8,489	9.2	
Others	18,180	19.7	
Total	85,821		92.8
Private Tenures			
Leasehold	4,582	4.9	
Sharefarmed	2,115	2.3	
Total	6,697		7.2
Total	92,518		100.0

Tenure Status of Farm Operators.

Of the eighty-four farmers interviewed, seventy-six either owned their properties outright (freehold) or occupied them by virtue of some direct tenure relationship with the Crown, e.g., lease in perpetuity,

settlement purchase, conditional purchase, etc. These farmers can all be classified as "owner-operators," since the various non-freehold Crown tenures offer a degree of security almost equivalent to that associated with a freehold title. Six farmers owned portions of their properties, and leased additional portions from private individuals. One farmer owned a property and regularly sharefarmed another property. The remaining farmer sharefarmed, on a permanent basis, portion of a large station property.

The total and percentage area occupied under various tenure relationships on survey farms is set out in Table X. It will be noted that Table X shows only the immediate tenure relation between the occupier and the land, and not, in the case of private tenures, the relation between the owner and the Crown.

Sharefarming.

As well as the two cases of regularized sharefarming mentioned above, sharefarming on other properties is commonly undertaken by occupiers of small farms, and by the sons of farmers who have insufficient area to keep them fully employed. The possession of a tractor which cannot be used to full capacity on the home farm also provides an incentive to grow crops on the shares. Sharefarming also provides a means of spelling over-cropped land and land infested with skeleton weed on the home property without undue loss of income. The extent to which survey farm families have engaged in sharefarming on outside properties is shown in Table XI. Between 10 and 12 per cent. of the total area

TABLE XI.

Sharefarming on Outside Properties by Survey Farmers and/or Members of their Families, 1948-1951.

Characteristic.	Year.			
	1948.	1949.	1950.	1951.
Number of Farm Families who Have Sharefarmed	13	13	14	10
Area of Wheat Sown on the Shares...	acres. 3,185	acres. 3,290	acres. 3,340	acres. 1,770

of wheat sown by survey farmers in the last three years has been sown on other properties on the shares system.

A few survey farmers have had sharefarmers do all or some of the cropping on their properties (see Table XII).

Approximately 5 per cent. of the total area sown to wheat on survey farms was handled by sharefarmers. The reasons given by operators for having sharefarmers do their cropping were old age, illness or pre-occupation with other enterprises.

The figures quoted in Tables XI and XII refer only to arrangements made between survey farmers and other persons. They do not include sharefarming arrangements between two members of a family both

fully employed on an area defined as a "survey farm," such arrangements were deemed to constitute a type of income arrangement between persons engaged in a single enterprise.

TABLE XII.

Area of Wheat Grown on the Shares System on Survey Farms, 1948-1951.

	Year.			
	1948.	1949.	1950.	1951.
Number of Farms Employing Sharefarmers	7	6	5	3
Area of Wheat Sown on the Shares on these Farms	acres. 1,740	acres. 1,610	acres. 1,530	acres. 642

There is little, if any, variation in the type of sharefarming agreement in use in the district. The landowner invariably provides the seed and the superphosphate, while the tenant uses his own plant and does all the work connected with sowing and harvesting the crop. The cost of carting the grain to the silo is shared equally. Total receipts are divided equally between owner and tenant. The owner has the right to graze the fallow and stubble land. In the event of a crop failure, the owner usually pays the tenant half the estimated value of the crop for grazing.

In recent years, sharefarming has become a less attractive proposition, from the tenant's point of view, than previously. The heavy infestation of the survey area with skeleton weed has considerably increased the risks attached to wheat farming[5], while rising wool prices have increased the profitability of sheep raising relative to wheat growing. Several farmers expressed dissatisfaction with the usual type of sharefarming agreement and claimed that some account should be taken of the benefit the owner derives from grazing the skeleton weed growth which is encouraged by the fallow cultivations.

Sideline Activities.

During the 'thirties and early 'forties, low returns from wheat growing induced many wheat farmers to take up various sideline activities, e.g., dairying, poultry and pig raising as a means of supplementing their incomes. Sidelines are of little importance at the present time, however. Of the eighty-four farmers interviewed, sixteen were found to be engaged in sidelines. One farmer ran a small dairy, pigs and turkeys; six other farmers raised pigs, and two others turkeys; four farmers ran a small number of beef cattle; three farmers who have been forced out of wheat growing due to skeleton weed, depleted soil fertility and erosion have turned their attention to commercial poultry raising for egg production. Two of the farmers interviewed devoted considerable time to business activities not connected with farming.

[5] For a fuller discussion of the impact of skeleton weed on wheat farming, see pages 44 and 45.

Mechanization.

Table XIII shows the progress of mechanization on survey farms. Horses had been replaced by tractors on approximately 40 per cent. of the farms by 1940. Very few new tractors were available during the war years, but since the war, mechanization has proceeded rapidly, and is now virtually completed. Only two farmers used horses to sow crops in 1951 (see Table XIV), and the areas sown were small.

TABLE XIII.

Numbers and Percentages of Survey Farmers Owning Tractors in Various Years.

Year.	Farmers Owning Tractors.	
	Number.	Percentage of all Farmers Interviewed.
		per cent.
1930	4	4.8
1934	11	13.1
1939	31	36.9
1940	33	39.3
1941	33	39.3
1942	33	39.3
1943	34	40.5
1944	39	46.4
1945	44	52.4
1946	52	61.9
1947	59	70.2
1948	65	77.4
1949	74	88.1
1950	77	91.7
1951	78	92.9

The increased efficiency of labour resulting from the use of tractors has not found expression in enlarged areas being sown to crops so much as in increased leisure for farm operators, and more timely farming operations. The introduction of tractors has released for other purposes land previously used for depasturing horses, and has obviated the need to cut the large quantities of hay required by working horses.

TABLE XIV.

Mechanization of Survey Farms.

Power Supply.	Number of Farms.		Percentage of All Farms.	
			per cent.	
One tractor	61		72.6	
Two tractors	12		14.3	
Three tractors	5		5.9	
Total using Tractors	—	78	—	92.8
Total using Horses		2		2.4
Total using neither Tractors nor Horses* ...		4		4.8
Total		84		100.0

* Cropping, if any, done by sharefarmer.

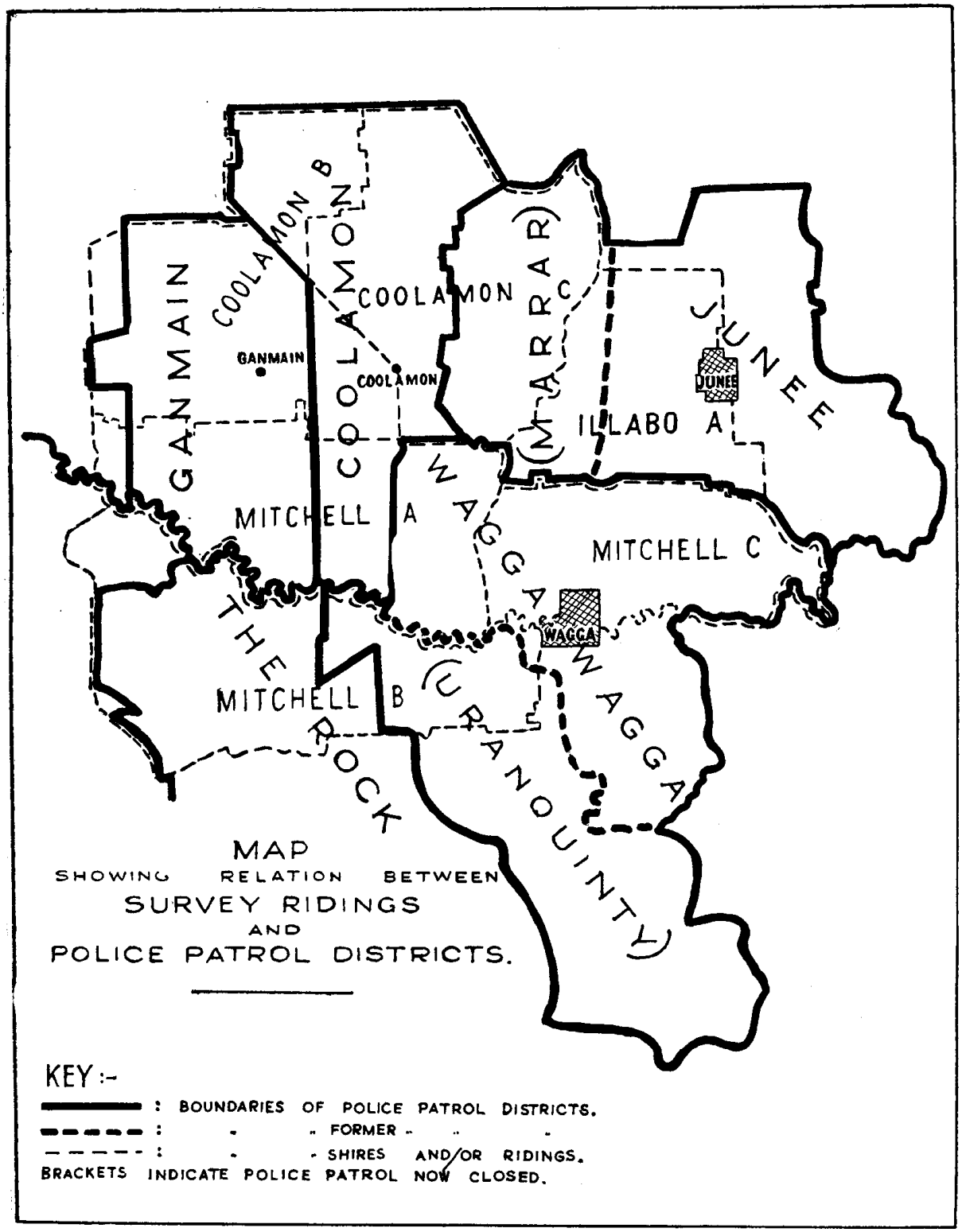
GANMAIN
COOLAMON B
COOLAMON
COOLAMON C
(MARRAR)
JUNEE
GANMAIN
COOLAMON
DUNEE
ILLABO A
MITCHELL A
WAGGA
MITCHELL C
WAGGA
THE ROCK
MITCHELL B
(URANQUINTY)
WAGGA
MAP
SHOWING RELATION BETWEEN
SURVEY RIDINGS
AND
POLICE PATROL DISTRICTS.
KEY:-
: BOUNDARIES OF POLICE PATROL DISTRICTS.
: - - FORMER - - -
: - - SHIRES AND/OR RIDINGS.
BRACKETS INDICATE POLICE PATROL NOW CLOSED.

Fig. III.

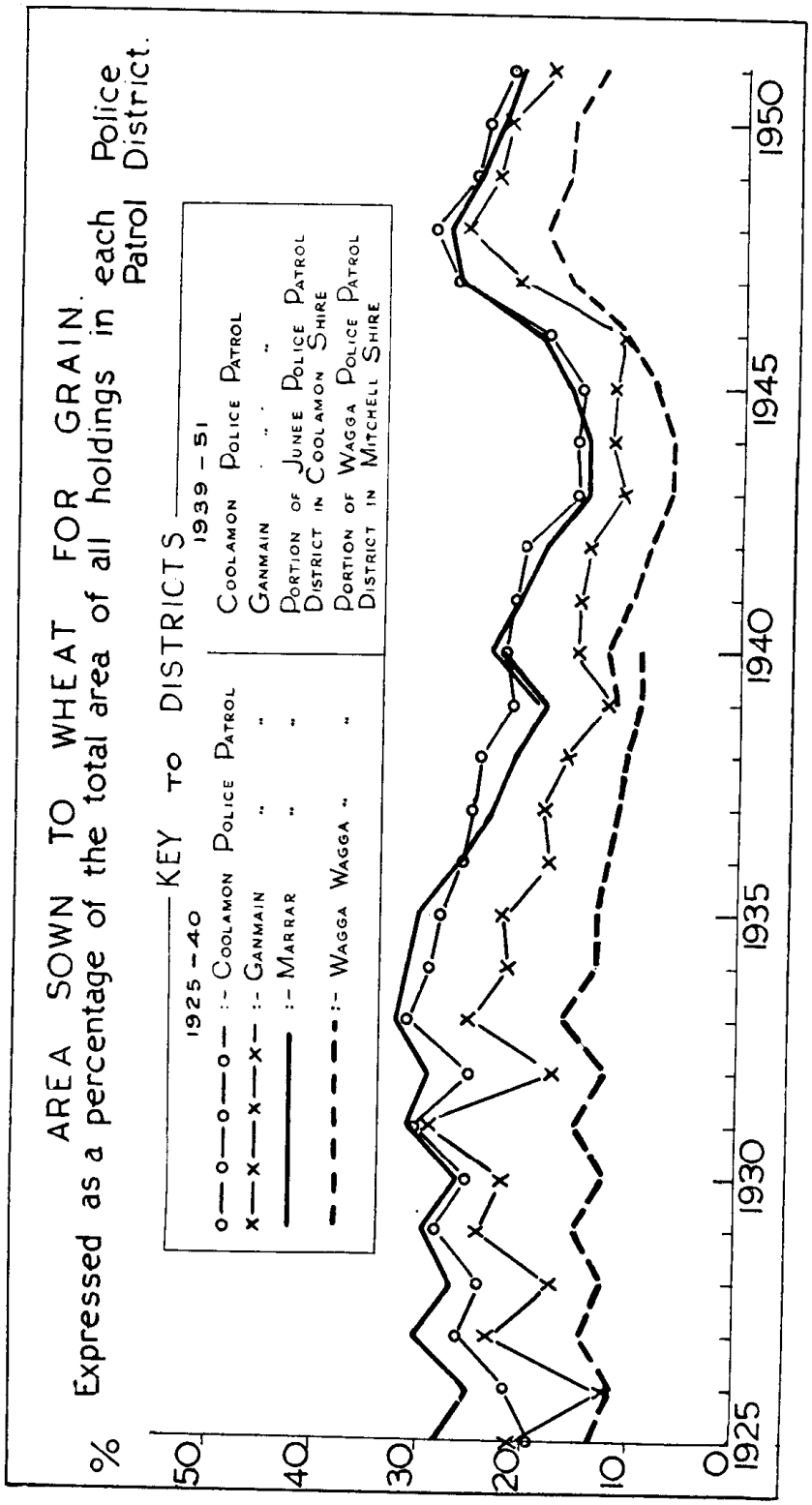
AREA SOWN TO WHEAT FOR GRAIN.
% Expressed as a percentage of the total area of all holdings in each Police Patrol District.
KEY TO DISTRICTS
1925 - 40
o—o—o—o— :- Coolamon Police Patrol
x—x—x—x— :- Ganmain " "
——— :- Marrar " "
- - - - - :- Wagga Wagga " "
1939 - 51
Coolamon Police Patrol
Ganmain " "
Portion of Junee Police Patrol District in Coolamon Shire
Portion of Wagga Police Patrol District in Mitchell Shire
50
40
30
20
10
0
1925
1930
1935
1940
1945
1950

Fig. IV.

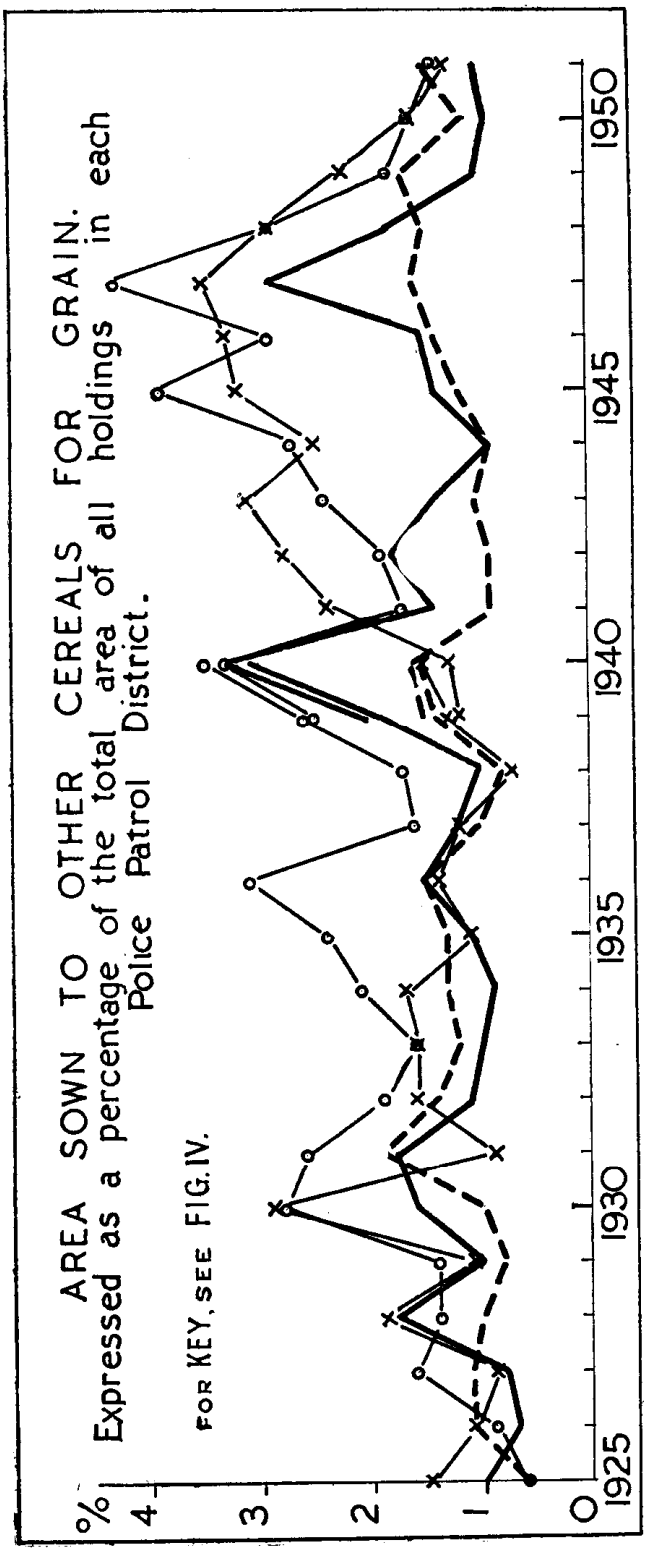
AREA SOWN TO OTHER CEREALS FOR GRAIN.
Expressed as a percentage of the total area of all holdings in each Police Patrol District.
FOR KEY, SEE FIG. IV.
%
4
3
2
1
0
1925
1930
1935
1940
1945
1950

Fig. V.

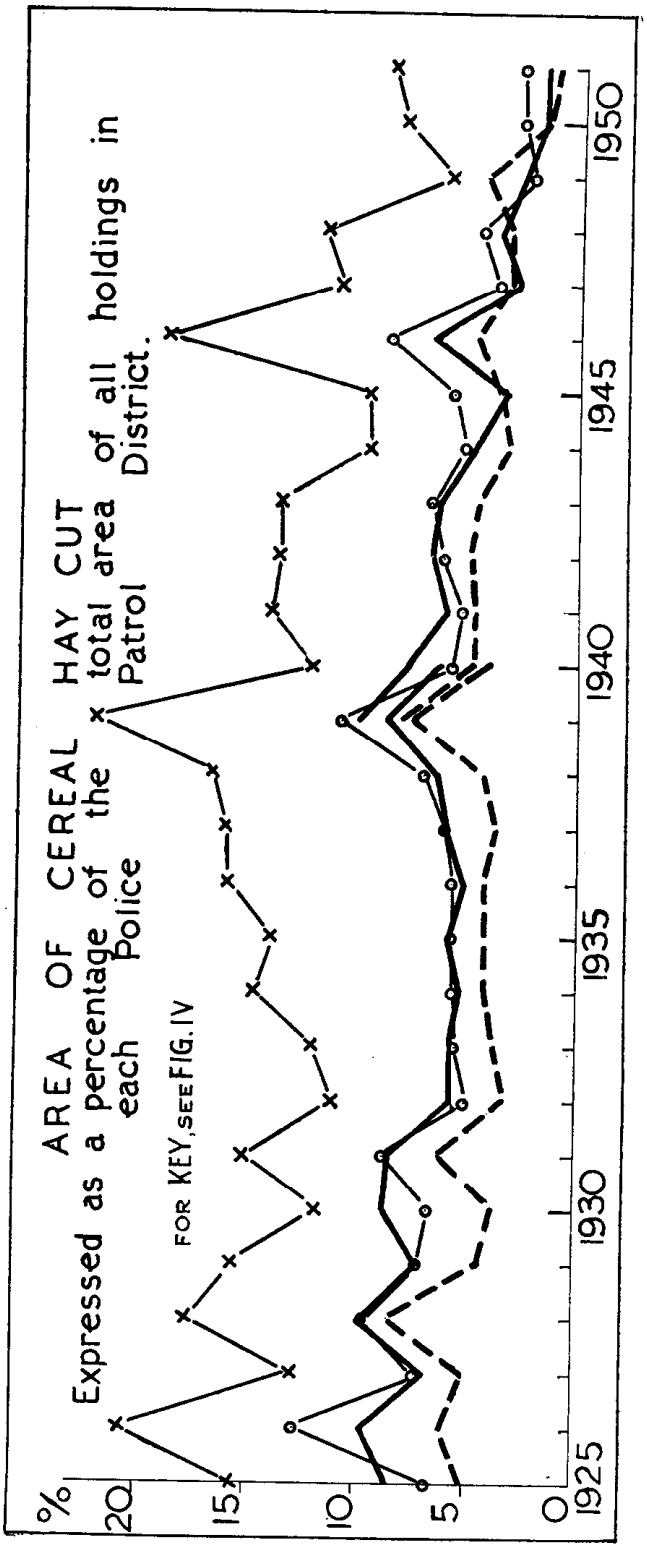
AREA OF CEREAL HAY CUT
Expressed as a percentage of the total area of all holdings in each Police Patrol District.
FOR KEY, SEE FIG. IV
%
20
15
10
5
0
1925
1930
1935
1940
1945
1950

Fig. VI.

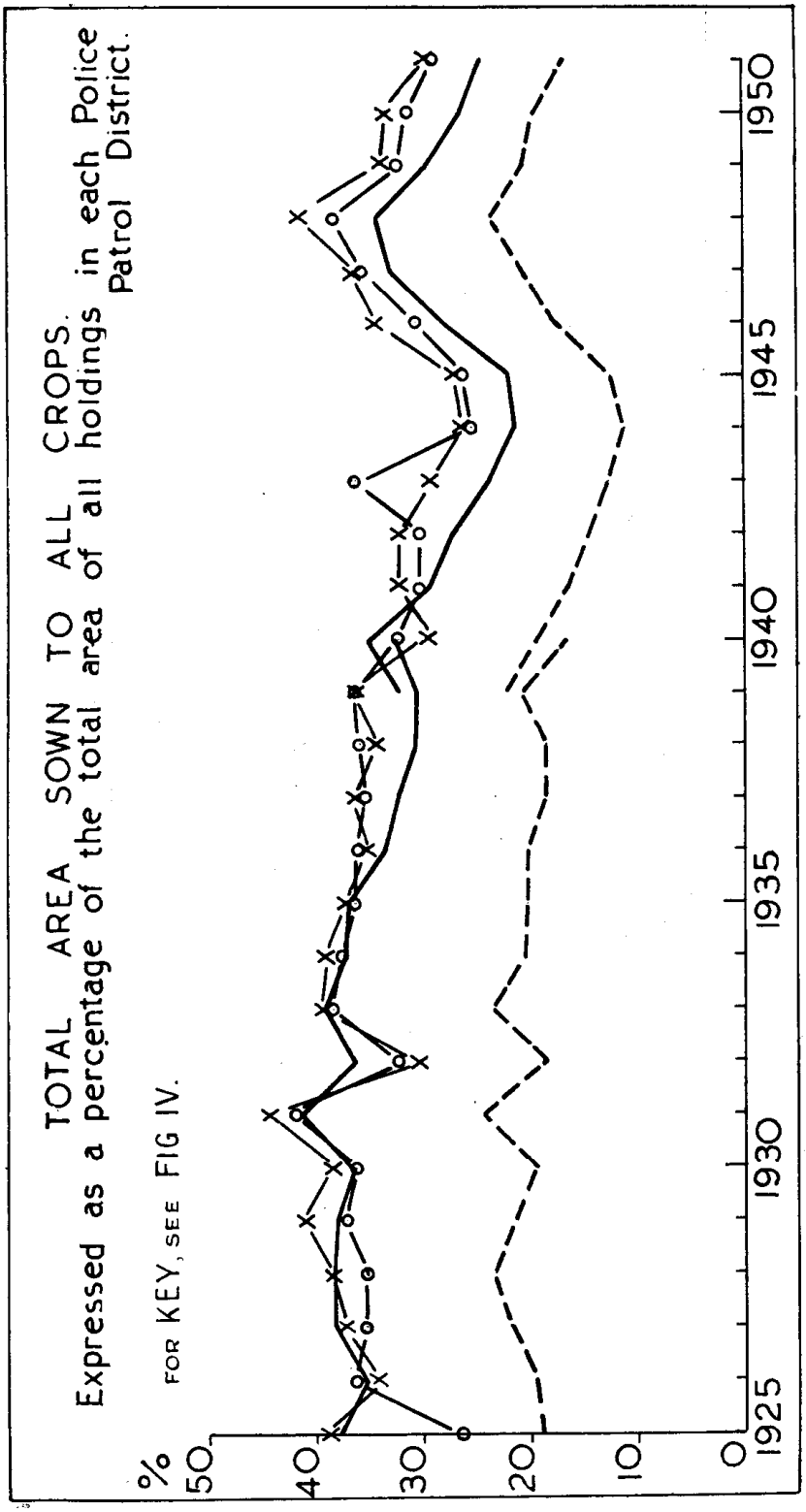
TOTAL AREA SOWN TO ALL CROPS.
Expressed as a percentage of the total area of all holdings in each Police Patrol District.
FOR KEY, SEE FIG IV.
%
50
40
30
20
10
0
1925
1930
1935
1940
1945
1950

Fig. VII.

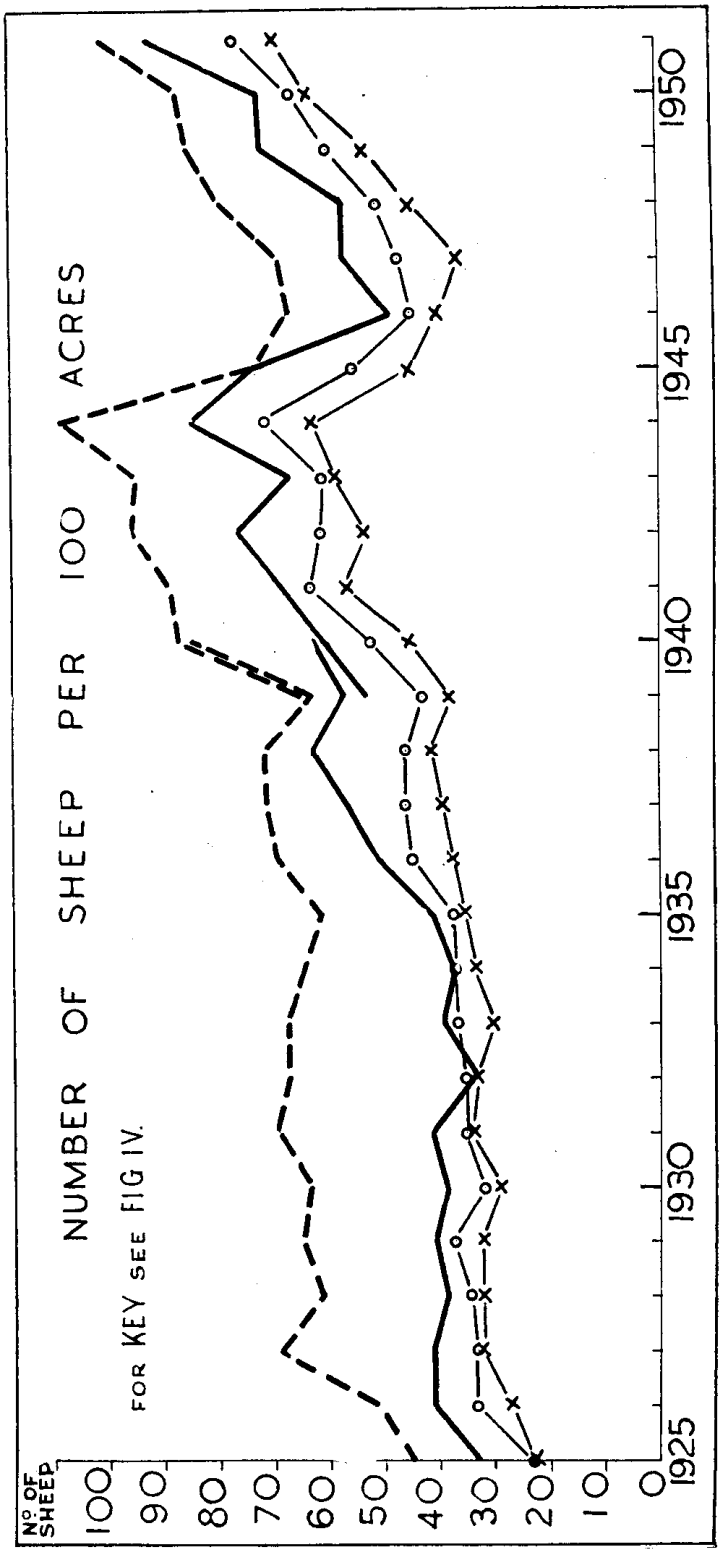
NUMBER OF SHEEP PER 100 ACRES
FOR KEY SEE FIG IV.
No OF SHEEP
100
90
80
70
60
50
40
30
20
10
0
1925
1930
1935
1940
1945
1950

Fig. VIII.

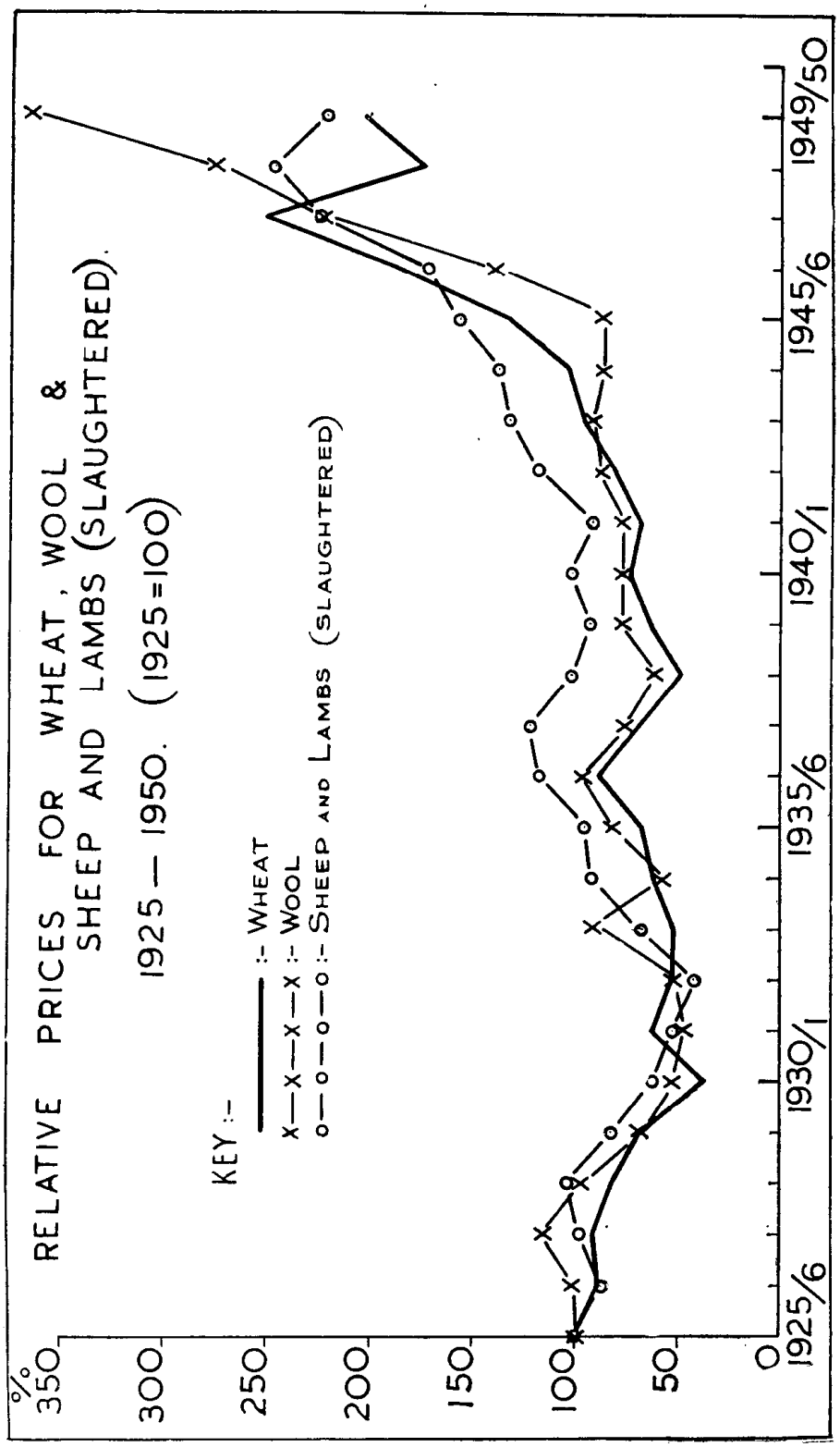
RELATIVE PRICES FOR WHEAT, WOOL & SHEEP AND LAMBS (SLAUGHTERED).
1925 — 1950. (1925=100)
KEY :-
:- WHEAT
:- WOOL
:- SHEEP AND LAMBS (SLAUGHTERED)
%
350
300
250
200
150
100
50
0
1925/6
1930/1
1935/6
1940/1
1945/6
1949/50

Fig. IX.

5. LAND USE IN THE SURVEY AREA.

Wheat farming consists of a number of closely related farming activities. Sheep raising, in which the emphasis may be placed on either the production of fat lambs or wool, both complements and supplements the commercial production of wheat for grain. Most farms also grow smaller quantities of wheaten and oaten hay, or oats for grain, either for sale or for use as fodder on the farm. Grazing oats are often sown to provide green feed for sheep in autumn and winter. The introduction and encouragement of leguminous pastures species provides a nexus between grazing and farming, since they increase both the sheep-carrying capacity and the fertility of the land.

The main purpose of this article is to discuss trends in the relative importance of those various enterprises and their relation to land use in the area. Attention will be directed to changes that have occurred during the last three or four years. The type of farming being practised to-day will be compared with the methods in vogue in the late 'twenties and early 'thirties—a period when farming methods became relatively standardized. Long-term trends in land use, based on police patrol statistics[6], and covering the period 1924-25 to 1950-51, will be shown graphically. A knowledge of these trends will assist the reader to place the more recent events in their proper perspective.

Traditional Wheat Farming Methods.

By the late 'twenties, farming methods in the south-west had become standardized to a large extent. Farming was directed almost exclusively towards the production of wheat as a cash crop. The advantages of winter fallowing had been recognized, and the popular wheat-fallow-wheat rotation represented the maximum intensity of cropping consistent with this practice. Oats were usually sown on stubble land, so that portions of most properties were even more intensively cropped from time to time (wheat-oats-fallow rotation). Wheat, also, was sometimes sown on stubble land.

With approximately half the arable area of the farm under crop, and the remainder under bare fallow for six months or more every year, the number of sheep that could be carried was strictly limited. Some farms carried no sheep at all, and on most they were regarded very much as a sideline. This attitude is revealed in "The Farmers' Handbook" (5th Edition, 1929), which, when discussing sheep on the wheat farm, says (p. 258): "Their indirect value is frequently of greater importance than the cash return. It is essential *to the success of the*

[6] Until 1939-40, statistics showing the number and total area of holdings, the area sown and production of the principal crops, and livestock numbers in each police patrol district of the State were published in the New South Wales Statistical Register. In the early war years, many police patrols were amalgamated and their boundaries were changed. This destroyed the basis for comparing these statistics over time, and their publication was discontinued. However, from unpublished statistics made available to the author by the State Statistician it has been possible to abstract data covering the years 1938-39 to 1950-51 for the police patrol districts of Coolamon and Ganmain, and for areas roughly corresponding to areas formerly covered by Marrar and Wagga patrols. (In the early 'forties, Marrar patrol was closed and incorporated in Junee patrol, and Wagga patrol was extended to include the area formerly covered by Uranquinty patrol.) These areas are listed in the key to Fig. IV and their boundaries can be located on Fig. III.

crop that the farmer have on his holding as many sheep as possible, *compatible with the most economical use of the land for wheat production*"[7]. Figs. IV to VIII reveal that during this period (roughly 1926-27 to 1934-35) the pattern of land use in the survey area was relatively stable, with a high proportion of land devoted to cropping (mainly wheat for grain) and fairly constant sheep numbers.

Trends in Land Use in the Area.

During the late 'thirties and early 'forties wheat production declined, and sheep raising, particularly for fat lamb production, increased in importance. The main reasons for these changes were the prolonged depression in wheat prices throughout this period, the development of local and export markets for lamb, which was accompanied by rising lamb prices (see Fig. IX), the increasing intensity of skeleton weed infestation, and, in the war years, shortages of labour and materials.

In the early post-war years, wheat production recovered rapidly until, in 1947-48, the area sown was almost as great as in the record years 1930-31 and 1932-33. This recovery can in large measure be attributed to the return to the land of ex-servicemen who were anxious to secure large cash returns in order to repay debts incurred in their resettlement, to the favourable wheat prices which prevailed and to the appeals made for increased food production. Since 1947-48, the area sown to wheat has again declined. The spectacular decline last year is not shown in Fig. IV as statistics are not yet available. However, an indication of its extent is given by the fact that on the survey farms, approximately half as much wheat was sown in 1951 as in 1949 (see Table XV).

TABLE XV.

Changes in the Relative Importance of Various Farm Enterprises, 1949 to 1951.

Characteristic.	Number of Farms for which Records Are Available for Years 1949–50–51.	1949.	1950.	1951.	1951, Expressed as a Percentage of 1949.
		per cent.	per cent.	per cent.	per cent.
Percentage Arable Area Sown to Wheat	82	33.7	30.5	18.7	55.5
Percentage Arable Area Sown to Oats	75	6.2	5.9	10.4	167.7
Percentage Arable Area Sown to Wheat and Oats	74	40.0	36.2	28.5	71.2
Percentage Total Area under Sown Pasture	84	9.4	13.4	18.1	192.6
		No.	No.	No.	
Number of Ewes joined per 100 acres	71	33.9	37.6	39.1	115.3

Sheep numbers reached their peak in 1943-44. Serious droughts in 1944 and 1946 considerably reduced the sheep population, but since then it has again increased rapidly. By 1951, sheep numbers had surpassed their previous peak in three of the police patrol districts under consideration and it is likely that the rate of increase evident since 1947-48 has at least been maintained in 1951-52.

Fig. VI suggests that there has been a slight downward trend in the area of hay cut. This is probably due to the decreased demand for

[7] My italics.

hay on farms as horses have been replaced by tractors. The increased production in 1945-46 was in order to replace fodder reserves depleted by drought in the previous year.

Only a small proportion of land has been devoted to growing cereals other than wheat for grain. Oats are the most important cereal grown for this purpose, and small acreages of barley are sometimes sown. (Fig. V is based on figures for oats and barley until 1939-40; between 1939 and 1950, the oats acreage only has been plotted. This accounts for the discontinuity of the graphs between 1939 and 1940.)

The trends revealed by the aggregate data presented in Figs. IV to VIII, although basic to a study of land use in the area, are clearly inadequate for a proper understanding of the situation. The recent fall in wheat acreage raises many questions, e.g., has there been a uniform decline in wheat production over the whole area, or has the decline been more marked in some areas than in others? Are farmers widening their crop rotations over the whole of their farms, or are they intensively cropping smaller areas, and turning the rest of their property out to grazing? To what extent are farmers sowing improved pastures? Is the present low level of cropping likely to remain a permanent feature of farming in the area, or is it essentially a temporary phenomenon? This leads to the question, what has motivated farmers in deciding to change their pattern of farming?

These are among the questions which the next section of this report, based on information obtained from survey farms, will attempt to answer.

Land Use on the Survey Farms.

Trends over the last three years in the relative importance of various farming activities on farms included in the survey sample are shown in Table XV. This table reveals that the following changes have occurred between 1949 and 1951.

1. The downward trend in wheat acreages evident in police patrol statistics since 1947-48 was sharply accentuated last year. Little more than half as much wheat was grown in 1951 as in 1949.

2. There was a significant increase in the area sown to oats in 1951.

3. The combined effect of greatly reduced wheat acreages partially offset by increased oats sowings has been to reduce considerably the proportion of land devoted to crops and thus release more land for grazing.

4. The upward trend in sheep numbers continued in 1951. The figures quoted for breeding ewes only, underestimate the extent of this increase, since a number of farmers interviewed have either wholly or partially replaced ewes by wethers.

5. In the past three years, the area of improved pastures has been almost doubled.

In 1948, and in earlier years, wheat was grown on a commercial scale on eighty-three of the farms included in the survey sample. (No information was available concerning the remaining farm due to a change

in ownership in 1949.) By contrast, in 1951, the situation on the eighty-four farms was—

1. Wheat sown as a commercial crop on .. .. .. 64 farms.
   (*a*) No appreciable change in area sown to wheat .. 16 farms.
   (*b*) Smaller areas of wheat sown .. .. .. 48 farms.
2. Wheat not sown as a commercial crop on .. .. 20 farms.
   (*a*) No wheat sown .. .. 14 farms.
   (*b*) Wheat sown for grazing only .. .. .. 2 farms.
   (*c*) Wheat sown for grain or hay for farm use only .. 4 farms.

Thus during recent years commercial wheat production has ceased on twenty farms, i.e., on approximately one-quarter of the farms surveyed.

No less spectacular than the decline in the wheat acreage has been the increased attention paid by farmers to pasture improvement. This is seen to be the case whether it is measured by either the total area under sown pasture (Table XV) or the number of farmers who sowed pastures for the first time in various years (Table XVI). Table XVI

TABLE XVI.

Years in which Improved Pasture (excluding Lucerne) Was First Sown on Survey Farms.

Year(s) in which Improved Pasture First Sown.	Number of Farms.	Percentage of all Farms.
		per cent.
Before 1940	15	17.9
1940–44 ...	6	7.1
1945–47 ...	5	6.0
1948	6	7.1
1949	8	9.5
1950	16	19.0
1951	3	3.6
Total	59	70.2

reveals that in 1951 improved pasture had been sown on seventy per cent. of the survey farms. In 1947, pasture had been sown on only thirty-one per cent. of the farms so that more than half the farmers who have undertaken pasture improvement have done so in the last four years. More farmers first established pastures in 1950 than in the whole period before 1940. The fact that few farmers commenced pasture improvement programmes in 1951 does not indicate a slackening of interest in this matter, since the area sown to pasture increased just as rapidly in 1951 as in the previous year. Rather does it indicate that most farmers who intend to carry out pasture improvement have already commenced to do so[8], and that on these farms enlarged areas of pasture are being established.

During the last three or four years, forty-three farmers have increased the number of ewes that they have joined. Ten farmers joined smaller

[8] Only three farmers who have not yet sown improved pastures signified their intention to do so in the future.

numbers of ewes in 1951 than in earlier years, but eight of these farmers have either wholly or partially replaced ewes by wethers. Wether flocks have been enlarged on eighteen of the survey farms. These facts, and the data embodied in Tables XXV and XXVI are inadequate for a full account of the trend in sheep numbers. The survey did not secure sufficient information to provide such an account, but the trend evident in police patrol statistics is shown in Fig. VIII.

In considering trends in land use, the survey area has so far been treated as a homogeneous whole. The changes in land use that have occurred in recent years on survey farms—small areas of cash crops sown, increased emphasis on sheep raising supplemented by the growing of fodder crops and pasture improvement—can be summarized as the adoption of a more diversified system of farming. But the extent to which diversification has proceeded varies considerably as between different parts of the survey area. These differences will now be considered; the unit of comparison will be the riding.

Reference to Tables XVII, XVIII, and XIX reveals that there are considerable differences between ridings both in the extent to which pasture improvement has been carried out and in the types of pasture that have been established. These differences correspond to the climatic controls discussed earlier. The proportion of land sown to improved pastures increases from west to east. Subterranean clover has been sown only in insignificant amounts west of the eighteen inches annual rainfall isohyet.

TABLE XVII.

Area under Improved Pasture (excluding Lucerne), 1948-1951, Expressed as a Percentage of the Total Area of all Survey Farms in each Riding.

Shire and Riding.	Year.			
	1948.	1949.	1950.	1951.
	per cent.	per cent.	per cent.	per cent.
Coolamon B	2.5	2.8	4.1	4.9
Mitchell A	4.8	5.1	8.5	13.5
Mitchell C	7.3	7.5	10.2	16.5
Coolamon C	12.6	16.9	23.3	31.6
Illabo A	8.4	14.8	23.7	26.1
Whole Area ...	7.3	9.5	13.4	18.1

There are only small areas of improved pasture in Coolamon B riding (see Table XVII). Wimmera rye grass is practically the only species sown (Table XIX). The greater part of this riding receives insufficient rainfall for the successful establishment of Subterranean clover, but, fortunately, ball clover provides a suitable substitute. This legume is widespread throughout the western portion of the survey area. It makes good growth on stubble and ley land, probably on the residual value of the superphosphate used with the cereal crop, and the sowing of Wimmera rye grass with the cereal results in a well balanced ley land

TABLE XVIII.

Types of Pasture Improvement Carried out on Survey Farms.

Type of Pasture Improvement Carried Out.	Shire and Riding.											
	Coolamon B.		Mitchell A.		Mitchell C.		Coolamon C.		Illabo.		Whole Area.	
	Number of Farms.	Per cent.	Number of Farms.	Per cent.	Number of Farms.	Per cent.	Number of Farms.	Per cent.	Number of Farms.	Per cent.	Number of Farms.	Per cent.
No Pasture Improvement of any kind	10	45.5	5	29.4	2	22.2	2	8.0	3	27.3	22	26.2
Top Dressed Natural Pasture only	1	4.5	0	0	1	11.1	0	0	0	0	2	2.4
Non-leguminous Sown Pastures only	7	31.8	5	29.4	2	22.2	3	12.0	2	18.2	19	22.6
Leguminous Sown Pastures —(including Lucerne)...	4	18.2	7	41.2	4	44.5	20	80.0	6	54.5	41	48.8
Total	22	100.0	17	100.0	9	100.0	25	100.0	11	100.0	84	100.0

TABLE XIX.

Composition and Area of Improved Pasture Sown on Survey Farms.

Composition of Sown Pastures.	Shire and Riding.											
	Coolamon B.		Mitchell A.		Mitchell C.		Coolamon C.		Illabo A.		Whole Area.	
	Area.	Per cent.	Area.	Per cent.	Area.	Per cent.	Area.	Per cent.	Area.	Per cent.	Area.	Per cent.
	acres.		acres.		acres.		acres.		acres.		acres.	
A. *Leguminous Pastures*—												
1. Lucerne	21	...	2	...	65	...	124	...	0	...	212	...
2. Subterranean Clover	4	...	735	...	0	...	1,830	...	395	...	2,964	...
3. Subterranean Clover and Wimmera Rye Grass	300	...	202	...	580	...	3,848	...	1,235	...	6,165	...
4. Barrel Clover and Wimmera Rye Grass	0	...	0	...	0	...	90	...	0	...	90	...
Total Leguminous Pastures ...	325	29.9	939	40.1	645	55.2	5,892	61.4	1,630	70.3	9,431	55.8
B. *Non-Leguminous Pastures*—												
1. Wimmera Rye Grass	1,162	...	1,370	...	523	...	3,708	...	687	...	7,450	...
2. Others	0	...	30	...	0	...	0	...	0	...	30	...
Total Non-Leguminous Pasture...	1,162	78.1	1,400	59.9	523	44.8	3,708	38.6	687	29.7	7,480	44.2
Total, All Pastures	1,487	100.0	2,339	100.0	1,168	100.0	9,600	100.0	2,317	100.0	16,911	100.0

pasture[9]. Most of the farmers in this riding who had not undertaken pasture improvement gave as reasons the unsuitability of the area for subterranean clover, and the prevalence on their properties of natural clovers and "trefoils" (medics).

The survey indicated that pasture improvement has made most progress in Coolamon C riding. Nearly thirty-two per cent. of the total area of the farms surveyed in this riding had been sown to pasture by 1951, and a high proportion (sixty-one per cent.) of this pasture contained sown legumes. Ninety-two per cent. of the farmers had undertaken pasture improvement of some kind. Factors making for the emphasis on improved pastures in this area are:

1. Subterranean clover can be successfully established over the greater part of the riding.

2. The soils are lighter, and skeleton weed infestation has been heavier here than in Coolamon B riding.

3. The topography is hillier than the western portion of the survey area and erosion is a more serious problem.

4. In the past, cropping has been carried out at a high level of intensity over most of the area.

5. A large station property in the Marrar district set an early example by pioneering Subterranean clover—Wimmera rye grass pastures in the area.

In Illabo A riding, considerable emphasis has been placed on pasture improvement, but not to quite the same extent as in Coolamon C riding. The proportion of pasture containing sown legumes is, however, higher. The situation in the remaining two ridings is intermediate between that prevailing in Coolamon B and C ridings.

Changes in the proportion of land devoted to the growing of crops in the five survey ridings are set out in Tables XX, XXI, XXII, and XXIII. It will be observed that in Coolamon B riding, where least pasture has been sown, the intensity of cropping was greatest, and the reduction in the area sown to crop since 1949 least. In Coolamon C and Illabo A ridings, where most pasture improvement has been carried out, the intensity of cropping throughout the period 1949-51 was lowest. Data for the other two ridings also demonstrate this inverse relationship between the areas sown to crops and pasture. This relation is shown diagrammatically in Fig. X, in which the proportion of land under improved pasture in each riding for the years 1948 to 1951 is shown in the form of histograms, and the proportion of land devoted to all crops as super-imposed heavy lines representing the tops of histograms.

Survey data indicates that the greatest decline in the area sown to crop has occurred in Illabo A riding. Of the eleven farmers interviewed there, only one, whose farm was located on the western edge of the riding, grew wheat commercially last year. Of the remainder, seven grew no wheat at all, and three sowed small quantities for farm use only. Merino ewes and/or wethers are being run on nine of the farms where commercial cropping has ceased (two of these farms also carry smaller numbers of crossbred and Corriedale ewes) and, on the remaining farm, English breed rams have been replaced by merino rams as a means of improving the wool quality of a crossbred ewe flock. There

[9] The classification in Tables XVIII and XIX of pastures as leguminous or non-leguminous refers only to the introduced species composing the pasture, and takes no account of the prevalence or absence of naturally occurring legumes.

TABLE XX.

Percentage Arable Area Sown to Wheat on Survey Farms, 1949-1951.

Shire and Riding.	Number of Farms for which Records Are Available.	Year.			1951, Expressed as a Percentage of 1949.
		1949.	1950.	1951.	
		per cent.	per cent.	per cent.	per cent.
Coolamon B ...	20	38.5	39.4	22.7	59.0
Mitchell A ...	17	36.7	33.7	24.1	65.7
Mitchell C ...	9	38.4	28.9	20.8	54.2
Coolamon C ...	25	29.4	25.3	16.5	56.1
Illabo A ...	11	24.7	18.1	3.4	13.8
Whole Area ...	82	33.7	30.5	18.7	55.5

TABLE XXI.

Percentage Arable Area Sown to Oats on Survey Farms, 1949-1951.

Shire and Riding.	Number of Farms for which Records Are Available.	Year.			1951, Expressed as a Percentage of 1949.
		1949.	1950.	1951.	
		per cent.	per cent.	per cent.	per cent.
Coolamon B ...	19	6.7	5.4	13.3	199.0
Mitchell A ...	15	6.5	6.9	8.4	129.2
Mitchell C ...	7	3.3	2.1	6.1	184.8
Coolamon C ...	24	6.7	6.5	11.1	165.7
Illabo A ...	10	4.2	6.4	5.7	135.7
Whole Area ...	75	6.2	5.9	10.4	167.7

TABLE XXII.

Percentage Arable Area Sown to Wheat and Oats on Survey Farms, 1949-1951.

Shire and Riding.	Number of Farms for which Records Are Available.	Year.			1951, Expressed as a Percentage of 1949.
		1949.	1950.	1951.	
		per cent.	per cent.	per cent.	per cent.
Coolamon B ...	18	44.6	44.5	35.7	80.0
Mitchell A ...	15	43.4	40.8	31.3	72.1
Mitchell C ...	7	40.7	30.8	26.9	66.1
Coolamon C ...	24	35.7	31.5	27.5	77.0
Illabo A ...	10	34.4	24.7	9.4	27.3
Whole Area ...	74	40.0	36.2	28.5	71.3

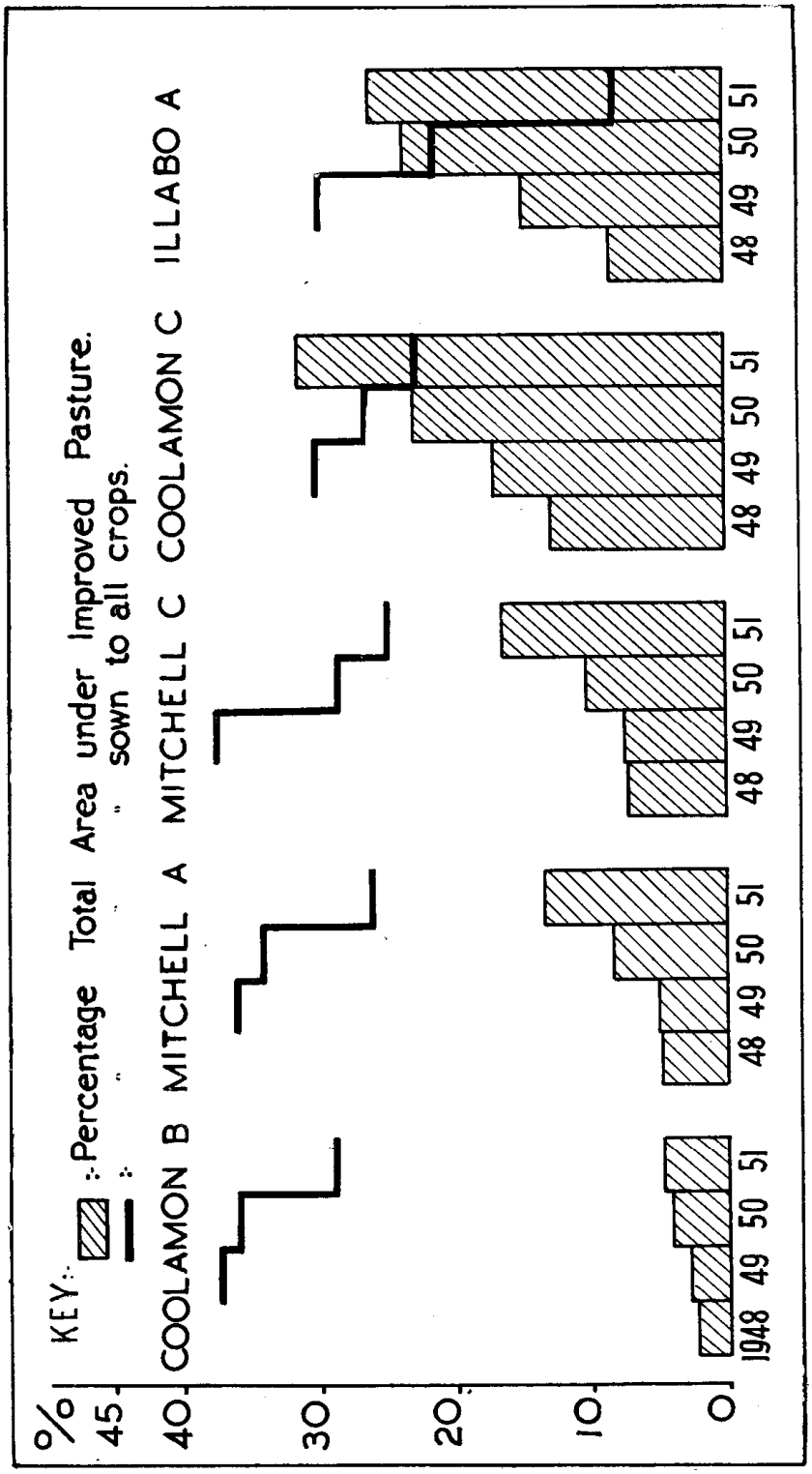
%
45
40
30
20
10
0
KEY:- Percentage Total Area under Improved Pasture.
" " sown to all crops.
COOLAMON B
MITCHELL A
MITCHELL C
COOLAMON C
ILLABO A
1948 49 50 51
48 49 50 51

Fig. X.

has been a decline in the proportion of ewes carried in this riding (see Table XXV), but this has been more than compensated for by an increase in the number of wethers.

In summary then, Tables XVII to XXV reveal that the trends evident in data relating to the area as a whole—reduction in the area sown to wheat, increased areas sown to oats and pastures, and larger sheep numbers—are common to each of the ridings considered separately, but that their incidence differs considerably as between ridings. Least change has occurred in that portion of the area that is sub-marginal for subterranean clover establishment, and the trends are most marked in those areas most suitable for grazing and pasture improvement. On the extreme eastern edge of the area, which roughly corresponds with the inner margin of the wheat belt, the tendency has been for farmers to cease cropping altogether and revert entirely to grazing for wool production. Thus the trend here is not towards diversification but towards specialization of the farming activities. Throughout the rest of the area, however, the changes reflect the adoption of a diversified system of farming in which wheat-growing and sheep-raising figure as complementary enterprises. A study of Table XXVI, which shows the number and proportion of farmers, in each riding, who have adopted or intend to adopt various crop rotations[10], confirms and extends these conclusions.

This table reveals that the most common modification of the wheat-fallow rotation that farmers have made has been to leave stubble paddocks out of cultivation for a year before fallowing (wheat-ley-fallow-wheat rotation). Pastures are usually sown with the wheat crop to ensure good grazing from these ley paddocks. In areas where subterranean clover can be established (notable in Coolamon C riding) a high proportion of farmers are extending the ley land pasture phase of the rotation for a number of years.

Further information concerning the frequency with which paddocks are being cropped is given in Tables XXVII and XXVIII. It will be seen that the wheat-fallow-wheat pattern of farming is still dominant, *on those areas still being cropped,* in all ridings, except Coolamon C. In the latter riding, over 70 per cent. of the area sown to wheat and 67 per cent. of the area sown to oats in 1951 had remained as ley land for a year or more before being fallowed in 1950. A greater proportion of oats was sown on stubble land in Coolamon B and Mitchell A ridings than in the other ridings.

These differences are an expression of the fact that the trend towards wider crop rotations and pasture improvement commenced earlier in Coolamon C riding than in other ridings.

[10] The information embodied in this table has to be accepted with caution, however, for the following reasons:—

1. Unless the rotation is a fairly rigid one, *e.g.*, wheat-fallow-wheat, farmers are not likely to adhere to it very strictly, but more probably will base their year to year decisions on the condition of various paddocks, the relative prices of the different farm products, etc. It must be remembered that one of the chief advantages of diversification is the increased flexibility which it introduces into the farming programme.

2. Many farmers have only recently decided to change their farming methods, so that many of the answers given in Table XXVII do not describe a rotation that has been or is being followed at present, but one that it is intended to follow in the future.

TABLE XXIII.

Percentage Arable Area Sown to Wheat and Oats (excluding Grazing Oats) on Survey Farms, 1949-1951.

Shire and Riding.	Number of Farms for which Records Are Available.	Year.			1951, Expressed as a Percentage of 1949.
		1949.	1950.	1951.	
		per cent.	per cent.	per cent.	per cent.
Coolamon B ...	18	41.5	42.5	30.3	73.0
Mitchell A ...	15	40.1	38.8	28.5	71.1
Mitchell C ...	7	38.9	30.4	22.8	58.6
Coolamon C ...	21	33.2	27.4	20.6	62.0
Illabo A ...	9	29.3	19.0	6.6	22.5
Whole Area ...	70	37.2	33.7	23.7	63.7

TABLE XXIV.

Numbers of Ewes Joined on Survey Farms, 1949-1951.

Shire and Riding.	Number of Farms for which Records Are Available.	Year.		
		1949.	1950.	1951.
Coolamon B	19	6,345	7,450	8,460
Mitchell A	15	5,410	6,065	7,060
Mitchell C	7	1,750	3,150	2,550
Coolamon C	21	8,920	9,820	9,850
Illabo A	8	2,480	2,360	2,510
Whole Area ...	70	24,905	28,845	30,430

TABLE XXV.

Number of Ewes Joined per 100 Acres on Survey Farms, 1949-1951.

Shire and Riding.	Number of Farms for which Records Are Available.	Year.		
		1949.	1950.	1951.
Coolamon B	19	31.0	33.6	38.1
Mitchell A	15	34.9	38.0	44.2
Mitchell C	7	29.8	53.6	43.4
Coolamon C	21	35.0	38.0	36.9
Illabo A	8	39.5	34.1	35.3
Whole Area ...	70	33.9	37.6	39.1

TABLE XXVI.

Number and Proportion of Survey Farmers Using, or Intending to Use, Various Crop Rotations.

Key: W=Wheat; O=Oats; Og=Grazing Oats; O/P=Grazing Oats and Wimmera Rye Grass; F=Fallow; L=Ley land (with or without improved pasture).

Frequency of Cropping.	Rotation or Intended Rotation.	Shire and Riding.											
		Coolamon B.		Mitchell A.		Mitchell C.		Coolamon C.		Illabo A		Whole Area.	
		No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.
1 Year in 2	WFW (and WOF)	4	...	2	...	2	...	2	...	1	...	11	...
	WO/P FW	1	...	...	...	...	...	...	...	...	...	1	...
	WFOFW	1	...	...	...	...	...	...	...	...	...	1	...
	WOLFW	...	...	1	...	...	...	...	...	...	...	1	...
	Total	6	27.3	3	17.7	2	22.2	2	8.0	1	9.0	14	16.7
Between 1 Year in 2 and 1 Year in 3.	WFOOgLFW	1	...	...	...	...	...	...	...	...	...	1	...
	WFW* and WLFW†	3	...	...	...	...	...	1	...	...	...	4	...
	WFW* and W(2-5L) FW† ...	1	...	1	...	...	...	1	...	...	...	3	...
	WLFWFWLFW	...	...	...	...	1	...	...	...	...	...	1	...
	Total	5	22.7	1	5.9	1	11.1	2	8.0	...	...	9	10.7
1 Year in 3	WLFW	8	...	9	...	2	...	9	...	2	...	30	...
	WLLW	...	...	1	...	...	...	1	...	...	...	2	...
	Total	8	36.4	10	64.7	2	22.2	10	40.0	2	18.2	32	38.1
Less than 1 Year in 3 ...	W (2-5L) FW	1	...	...	...	3	...	9	...	...	...	13	...
	W(4L)W	...	...	...	...	...	...	...	...	2	...	2	...
	WFW or WLFW Followed by Long Pasture Phase	...	...	2	...	...	...	1	...	2	...	5	...
	Total	1	4.5	2	11.8	3	33.4	10	40.0	4	36.4	20	23.8
No Commercial Cropping	Plans Indefinite	2	9.1	1	5.9	1	11.1	1	4.0	4	36.4	9	10.7
	Total	22	100.0	17	100.0	9	100.0	25	100.0	11	100.0	84	100.0

* Rotation adopted on land where least skeleton weed infestation has occurred.
† Rotation adopted on land where skeleton weed infestation is greatest.

TABLE XXVII.

Proportion of Wheat Sown, 1951, on Land Last Cropped in 1950, 1949, 1948 or Earlier.

Shire and Riding.	Percentage of Total Area Sown to Wheat in 1951 that Was Sown on Land Last Cropped in—				
	1950.	1949.	1948.	Earlier.	Total.
	per cent.	per cent.	per cent.	per cent.	per cent.
Coolamon B	3.7	70.0	15.6	10.7	100.0
Mitchell A	13.9	51.3	28.9	5.9	100.0
Mitchell C	3.0	72.9	9.0	15.1	100.0
Coolamon C	0	25.8	51.4	22.8	100.0
Illabo A	9.4	90.6	..	..	100.0
Whole Area ...	5.0	53.9	27.9	13.2	100.0

TABLE XXVIII.

Proportion of Oats Sown, 1951, on Land Last Cropped in 1950, 1949, 1948 or Earlier.

Shire and Riding.	Percentage of Total Area Sown to Oats in 1951 that Was Sown on Land Last Cropped in—				
	1950.	1949.	1948.	Earlier.	Total.
	per cent.	per cent.	per cent.	per cent.	per cent.
Coolamon B	52.1	20.5	17.0	10.4	100.0
Mitchell A	45.7	20.4	33.9	..	100.0
Mitchell C	16.9	80.3	2.8	..	100.0
Coolamon C	21.1	11.9	32.4	34.6	100.0
Illabo A	41.6	51.7	..	6.7	100.0
Whole Area ...	38.4	22.0	23.0	16.6	100.0

TABLE XXIX.

Fallowing—Wheat.

Proportion of Wheat Sown, 1951, on Land Receiving Various Treatments.

Shire and Riding.	Percentage of Total Area Sown to Wheat in 1951 that Was Sown on Land Receiving the Following Treatments—			
	Long Fallow.	Short Fallow.	No Fallow.	Total.
	per cent.	per cent.	per cent.	per cent.
Coolamon B	91.1	2.7	6.2	100.0
Mitchell A	75.9	10.2	13.9	100.0
Mitchell C	75.9	..	24.1	100.0
Coolamon C	98.0	0.6	1.4	100.0
Illabo A	34.0	..	66.0	100.0
Whole Area ...	87.1	3.5	9.4	100.0

6. MISCELLANEOUS FARMING PRACTICES.

During the course of the survey, information was sought concerning various practices commonly followed on wheat farms. The results are summarised below.

1. Stubble Burning.

This practice which was almost universal in the 'twenties and 'thirties has now all but ceased on the survey farms. Only nine of the eighty-four farmers indicated that they still burned stubble. This change is another aspect of the widening of crop rotations and the extension of pasture improvement.

TABLE XXX.

Fallowing—Oats.

Proportion of Oats Sown, 1951, on Land Receiving Various Treatments.

Shire and Riding.	Percentage of Total Area Sown to Oats in 1951 that Was Sown on Land Receiving the Following Treatments—			
	Long Fallow.	Short Fallow.	No Fallow.	Total.
	per cent.	per cent.	per cent.	per cent.
Coolamon B	35.9	3.6	60.5	100.0
Mitchell A	38.8	4.3	56.9	100.0
Mitchell C	12.7	..	87.3	100.0
Coolamon C	66.4	3.7	29.9	100.0
Illabo A	6.7	6.7	86.6	100.0
Whole Area ...	44.1	3.7	52.2	100.0

TABLE XXXI.

Month Fallowing was Commenced in Preparation for the 1951 Crop on Survey Farms.

Year.	Month.	Number of Farms.	Percentage of Total.
			per cent.
1950	May	1	1.5
	June	8	12.3
	July	23	35.4
	August ...	19	29.3
	September ...	8	12.3
	October ...	1	1.5
1951	January ...	4	6.2
	February ...	1	1.5
	Total ...	65	100.0

2. Fallowing.

The proportion of wheat and oats sown in 1951 on land that had received long fallow, short fallow or no fallow treatment is shown for each riding in Tables XXIX and XXX. Fallowing that was commenced before or during October in the previous year was defined as long fallowing. It will be observed that in all ridings except Illabo A, the bulk of the 1951 wheat crop was sown on long fallow land. In all ridings, except Coolamon C, oats were sown mainly without the benefit of a fallow treatment.

Table XXXI reveals that fallowing is most frequently commenced during the months of July and August.

Farmers were asked whether fallowing was now usually commenced earlier, or later than in the 'thirties. Their answers were as follows:

Later	29
Earlier	..
No change	22
No opinion	28

Reasons given by farmers for a later fallowing were:—

1. The use of tractors enables fallowing to be carried out much more quickly than was possible using horses, so that the operation can be commenced later.

2. The increased numbers of sheep being carried render it impracticable to fallow the whole area to be cropped in the one operation. Fallowing is carried out in stages so that the maximum benefit of skeleton weed and pasture growth can be obtained.

3. Wheat Varieties Sown.

In the following list, the varieties of wheat sown on survey farms are arranged in their approximate order of importance.

Bencubbin.
Kendee, Celebration.
Ford.
Waratah, Bobbin.
Bordan.
Charter.
Dundee.

4. Fodder Conservation.

Information concerning fodder conservation was obtained from eighty-four of the survey farmers. Twenty-four had conserved oats (grain) and hay, forty-nine hay only, and two grain only, for use on the farm in 1951. Six farmers had conserved no fodder.

The average quantity of hay on hand at the end of the 1950 harvest on the seventy-three farms conserving hay was approximately 50 tons. More than half the farmers had conserved less than 30 tons of hay, but several farmers living in the Ganmain-Matong area—which has for many years been an important hay producing district (see Fig. VI)—had cut more than 100 tons of hay, the greater part of which was later sold. The average quantity of oats conserved by the twenty-six farmers conserving oaten grain was 626 bushels.

Due to the dry seasonal conditions which prevailed in the summer of 1950-51, and the tendency for farmers to overstock on account of the high wool prices, quantities of this conserved fodder was fed out last year. The increased oat sowings in 1951 indicated that farmers intended to augment their depleted fodder reserves. This increase in the area sown to oats was achieved largely at the expense of wheat production.

7. FACTORS CAUSING REDUCTION IN WHEAT ACREAGES.

When interviewing farmers various attempts were made to discover what factors had influenced them in deciding to change their farming methods. The question of motivation is, of course, very complex, and all that could be expected, and all that was achieved was a rough indication of farmers' attitudes. Attention was directed to the question, what has influenced farmers in growing less wheat in recent years? An answer to this question goes a long way towards explaining other aspects of the trend towards diversification. A list of likely reasons for growing less wheat was prepared, and each of the sixty-eight farmers who had reduced their wheat acreages was asked to indicate whether or not he had been influenced by each reason. In addition to the reasons suggested to the farmers, a number of other reasons were suggested by farmers themselves; in the list below, these reasons are marked by an asterisk. Farmers might be expected to tend to agree with the reasons suggested to them by the interviewing officers. However, it is considered that the bias from this source was not very great, since farmers did not seem to hesitate to discount various factors suggested to them.

Factors which influenced farmers in growing less wheat are set out below. The number opposite each factor indicates the number of farmers who gave it as a reason for growing less wheat. Most farmers gave several reasons.

Skeleton weed	53
Declining soil fertility ("spelling the land")	40
High wool prices compared with wheat prices	33
Seasonal conditions	20
Shortage of labour	17
Shortage of superphosphate	17
Shortage of machinery and parts	14
High incomes	14
*High cost of wheat-growing	9
Shortage of bags	7
*Riskiness of wheat-growing	6
*Old age	4
High oat prices compared with wheat prices	3
Soil erosion	3

The reasons are listed in their approximate order of importance, on the assumption that the number of farmers mentioning each reason is a rough guide to its relative importance.

Attempts were made to assess more precisely the influence of two factors, viz., seasonal conditions and the shortage of superphosphate, in causing the reduction in wheat acreage, by comparing the areas that farmers intended to sow with their actual sowings. As will be seen, these attempts were not altogether successful.

Skeleton Weed.

The first skeleton weed plant to be identified (as *Chondrilla juncea*) in Australia was found in the Marrar district in 1916. It is believed that the plant was introduced into Australia with fodder imported from the west coast of the United States during the drought of 1914. Since then it has become established over the South-western Slopes and Riverina and the Central-western Slopes. The traditional method of farming in these areas (the wheat-fallow-wheat rotation) was peculiarly suited to the spread of skeleton weed, since it thrives on cultivation. Infestation had reached serious proportions by the mid-'thirties; in 1935, meetings of farmers were held at Wagga to discuss the skeleton weed problem, and a reward was offered for the discovery of a successful means of controlling it.

Skeleton weed is a deep-rooting perennial plant, not unlike a dandelion in its early stages, but which later produces a skeleton-like top growth which reaches a height of from two to four feet. It spreads mainly by seed, which it produces in profusion. The seeds have a light pappus attached which enables them to be carried long distances by the wind. Growth normally commences in May, and continues slowly until mid-spring, when the vigorous top growth is made. Flowers and seeds are produced in late summer, and the top-growth dies off. The root, however, is of a perennial nature, and makes fresh growth the following autumn.

The weed greatly increases the difficulties and risks attached to wheat growing. It lowers the yield by competing with the growing crop, and by interfering with harvesting operations. It is believed that the competition effect is largely due to the removal of water and nitrates from the soil by the perennial weed before the wheat seedlings have become established. This competition is the early stages is of crucial importance: the wheat has to "get away to a good start," otherwise skeleton weed is likely to become dominant. Crops sown "dry," i.e., crops sown in anticipation of the opening rains, suffer greater competition from skeleton weed than crops sown after a cultivation which has killed skeleton weed plants germinated by earlier rain. When horses were used for the sowing operation, their slow rate of work often compelled the farmer who wished to sow a large area of crop to sow portion of it before the opening rains. The introduction of tractors has enabled farmers to abandon this undesirable practice.

The difficulties of harvesting crops heavily infested with skeleton weed not only causes a loss in yield but damage to machinery as well.

If skeleton weed infested paddocks are spelled from crop for a number of years, the severity of skeleton weed infestation in the following crop is greatly reduced. The sowing of Wimmera rye grass and subterranean clover pastures on such ley paddocks further reduces the severity of infestation, and lucerne, also a deep-rooting plant, competes successfully with the weed and leads to control. Until recently these have been the only methods available to farmers of mitigating skeleton weed infestation. However, recent tests indicate that hormone sprays may provide a feasible means of inhibiting the growth of skeleton weed in the wheat crop.

Skeleton weed is an excellent sheep feed and as such has come to occupy an important place in the economy of farms. It grows prolifically

on fallows during spring and summer, and so long as it is prevented, by heavy grazing, from becoming stalky, provides an abundance of feed suitable for the fattening of lambs. The fat lamb industry in the area has, according to the farmers interviewed, achieved its present importance on the basis of the utilization of skeleton weed. The degree of dependence that farmers have come to place on skeleton weed as a sheep feed is sharply illustrated by their answers to the question: "Would you prefer to be with, or without skeleton weed on your property?" Only a bare majority of farmers (forty-six) said they would rather be without it, while thirty said they would prefer to have it, and eight were undecided.

Skeleton weed thus provides farmers with a double incentive to adopt diversified farming methods. On the one hand, it makes wheat-growing a much more hazardous business, and renders continuous cropping out of the question, while on the other, it considerably increases the sheep carrying capacity of farms.

However, in order to derive the maximum benefit from skeleton weed for grazing, it is necessary to cultivate the land. (Of forty farmers who said that they would not consider dropping wheat-growing altogether under any circumstances, eleven gave as a reason the need to encourage the growth of skeleton weed on fallows.) Therefore, there are limits to the extent to which skeleton weed discourages cropping.

In 1950, skeleton weed was very troublesome. An exceptionally wet season favoured its growth and it created formidable harvesting difficulties, resulting in a considerably reduced yield of wheat. This recent adverse experience probably had a major effect in dispelling any complacency that farmers may have had concerning skeleton weed.

Declining Soil Fertility.

The impression was gained during the survey that most farmers have become aware of the depressing effect on soil fertility of continuous cropping, and that wider rotations with smaller areas under crop are highly desirable as a basis for permanent agriculture in the area. However, it is doubtful whether there exists the same degree of awareness of the role of leguminous crops in restoring nitrogen to the soil. A prevalent attitude is that merely "spelling the land" is all that is required.

In general, skeleton weed infestation provides farmers with a more immediate and obvious demonstration of the need for longer crop rotations than does declining soil fertility. Yields are an unreliable indication of trends in the fertility of soil, since so many uncontrolled variables affect the situation, e.g., seasonal conditions, new varieties, new farming methods, the intrusion of new weeds, etc. A view put forward by several farmers who are themselves aware of the need to maintain soil fertility, is that skeleton weed has served a very useful purpose in forcing farmers to adopt longer rotations.

High Wool Prices.

Wool prices rose steadily between 1945-46 and 1949-50, and then jumped to unprecedented levels in 1950-51 (prices for the 1950-51 season are not shown in Fig. IX). Wheat prices also rose sharply

between 1944-45 and 1947-48, but since then have been at a lower level.[11] These price movements have been a direct incentive to farmers to put greater emphasis on grazing at the expense of cropping. Thirty-three farmers indicated that, in deciding to reduce their wheat sowing, they had been influenced by high wool prices, relative to wheat prices. However, most of these men emphasized agronomic reasons for making this decision. A very common attitude among farmers was that the high wool prices provided them with "a wonderful opportunity to spell the land."

Many farmers have taken steps to improve the wool quality of their flocks in response to the high wool prices. During the past three or four years, the following innovations have been carried out with this end in view:—

Wethers introduced on	10	farms.
Number of wethers increased on	18	„
Ewes partially replaced by wethers on	5	„
Ewes completely replaced by wethers on	3	„
Finer wool type ewe introduced on	22	„
Merino ewes introduced on	7	„
Crossbred ewes completely replaced by Merinos on	2	„
English-breed ram replaced by Merino ram on	4	„
English-breed ram replaced by Corriedale and/or Polwarth rams on	4	„
Corriedale ram replaced by Merino ram on	2	„

High Farm Incomes.

Due to the high prices that they are receiving for their products, farmers are at present experiencing great prosperity, both as compared with their own position during and before World War II, and the position of non-farming people to-day. As their living standards increase there is a tendency for people to demand more leisure and there is little doubt that farmers have chosen to take part of their increased prosperity in this form. Farmers' hours of work have always been longer than industrial workers', and this provides them with a rationale for making this choice. Although the introduction of tractors has made wheat growing a less arduous job than when horses were used, it is still much harder work than sheep raising, so that on these grounds one could expect a shift in emphasis from farming to grazing.

The fourteen farmers who mentioned high incomes as a factor contributing to their decisions to reduce wheat sowings last year were undoubtedly motivated by the considerations suggested above. It is likely, moreover, that more farmers than cared to mention the fact had been influenced by the same considerations.

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[11] Prices received by Australian farmers for wheat have been kept at a much lower level than world prices, due to the operation of the Wheat Stabilization Scheme. Other disincentives to wheat production arising from the scheme's operation are:

(i) Payments for wheat delivered have been made in the form of small advances spread over a long period, and

(ii) Farmers are aware that the less wheat that is grown, the lower the average price will be, due to the fact that a larger proportion of the crop will be sold at the (lower) home consumption price.

Effects of Shortages.

Shortages of various items have contributed to the decline in wheat production. Farmers mentioned superphosphate, labour, machinery and bags as being in short supply. It is difficult to assess the influence of shortages on farmers' production decisions; the indirect effects of shortages—uncertainty, a sense of frustration and annoyance—are probably as important as their direct effects in inhibiting production. It is also difficult to discover whether farmers are referring to the absolute shortage of commodities as distinct from the high prices which goods in short supply are able to command.

Shortage of labour has hindered production, particularly on the larger farms and on farms where the operator is old. Seventeen farmers mentioned shortage of labour as being a cause of reduced wheat acreages. Of these, fifteen indicated their willingness to employ labour, at prevailing wages rates, if labour were available. Seven farmers wanted to employ permanent labour, and eight casual labour.

In the three years 1938-39 to 1940-41 the average number of males permanently employed on farms in the police patrol districts covering the survey area was 1,466. By contrast the average number employed for the three years 1948-49 to 1950-51 was 1,146, representing a decline of 22 per cent. Nevertheless, against this reduction in the labour force, and perhaps offsetting it to a large extent, must be placed the fact that the more widespread use of tractors in the post-war years has greatly increased the efficiency of the available labour. Hay making requires the employment of more casual or contract labour than wheat harvesting, so that the labour shortage has probably inhibited hay production to a greater extent than wheat production.

It would be wrong to discount the influence of the labour shortages in causing the decline in wheat growing, for it has clearly had some effect. However, it seems likely that many popular discussions of the subject over-estimate the effect of the shortage.

Shortage of superphosphate supplies in the survey area has contributed to the decline in wheat acreages. This shortage could be expected to influence a farmer's production decisions in four main ways. It might cause him to—

(1) grow less crop;
(2) reduce the rate of application of superphosphate to the crop;
(3) substitute oats for wheat, since customarily the former is less heavily fertilized than the latter; and/or
(4) use less superphosphate for topdressing pastures.

Farmers were asked whether they had been able to obtain enough superphosphate for their cropping in 1951. On the basis of their replies, the shortage has had the following effects:

Seventeen farmers, or roughly one-fifth of those interviewed, claimed that they had received insufficient supplies; twelve farmers reduced the rate of application of superphosphate to their wheat and/or oats crops; five farmers reduced the area sown to wheat, the total reduction on these farms being 560 acres. One of the five farmers substituted oats for wheat in a 100-acre paddock, and also reduced the fertilizer rate on the oats.

These results indicate that the shortage of superphosphate has not had much influence in bringing about this year's decline in wheat acreage in the area surveyed. However, many farmers who did receive adequate supplies expressed annoyance at the difficulties they had had to overcome in getting them. The effect on the farmer's planning decisions of the uncertainty of securing adequate superphosphate supplies is not taken into account in the analysis given above, so that it may under-estimate the influence of the shortage.

Seasonal Conditions.

Unfavourable seasonal conditions prevailed during the fallowing period which preceded the sowing of the 1951 crop. Excessive rainfall in 1950 hindered fallowing operations, compacted the soil and encouraged the growth of weeds. The first few months of 1951 were abnormally dry, and gave little opportunity for working up satisfactory seed-beds. Seeding was delayed until May and June, when above-average rainfall was recorded. However, there were some delays in seeding even after the opening rains, due to the continuing wet weather.

Of the eighty-four farmers interviewed, twenty, or approximately one-quarter, had been prevented by seasonal conditions from sowing as great an area of crops as they had intended. Had all these farmers been able to sow as much crop as they had intended, totals of 16,315 acres of wheat, and 8,926 acres of oats, would have been sown. These intended areas compare with 14,778 acres of wheat, and 7,917 acres of oats actually sown. Thus adverse seasonal conditions appear to have been responsible for a reduction of about 9 per cent. in the area of wheat sown and approximately 11 per cent. in the area of oats. Farmers intended to sow 32 per cent. of the arable area of their farms to crops, but they actually sowed only 29 per cent. In 1950, 36 per cent. of the arable area was cropped.

If it could be assumed that seasonal conditions in no way adversely affected sowings in 1950, the conclusion would follow that almost half (45 per cent.) of the reduction in cropped areas that occurred between 1950 and 1951 was caused by adverse seasonal conditions in 1951. Such an assumption cannot, of course, be made. We do not know how seasonal conditions influenced sowings in 1950. However, it is safe to assume that the season is never perfect, so that in any year there is likely to be some gap between intended and actual sowings. Therefore, the estimate given above, based on the assumption of a perfect season for 1949-50, exaggerates the influence of seasonal conditions in causing the reduction in acreage between 1950 and 1951.

However, there is another and more serious reason for believing that the analysis over-estimates the importance of seasonal conditions. In the comparison made between actual and intended sowings in 1951, no account has, or can, be taken of how much farmers *wanted* to carry out their intentions. Whether or not a farmer carries out his cropping intentions depends on the firmness of those intentions, as well as on the seasonal adversities with which he is confronted; the more apathetic he is, the more likely he is to be discouraged. As has been shown, a number of other factors reduced farmers' incentives to grow crops in 1951. As a result, they were probably more easily discouraged by unfavourable seasonal conditions than they would otherwise have been.

Thus, the method of analysis used is strongly biassed towards over-estimating the influence of seasonal conditions. Therefore, all it can do is set an upper limit to their possible influence. This leads to the conclusion that, at most, 45 per cent. of the reduction in cropped acreage that occurred between 1950 and 1951 is attributable to adverse seasonal conditions. It is probable that seasonal conditions had a much smaller effect than this figure indicates.

8. SUMMARY.

Eighty-four wheat farmers, or approximately 11 per cent. of all wheat farmers residing in a selected area of the South-west Slopes and Eastern Riverina, were interviewed last year in order to obtain the information presented in this report.

The selected area embraced A and C ridings of the Shire of Mitchell, B and C ridings of the Shire of Coolamon and A riding of the Shire of Illabo.

During the past twenty to thirty years there has been a persistent tendency in this area for wheat farms to increase in size.

Tractors have replaced horses on practically all farms in the area. The majority of farmers did not acquire tractors until during the last eight years.

Since 1947-48, the area sown to wheat has declined steadily, while the area devoted to improved pasture, and the number of sheep carried have both increased.

These trends reflect the adoption by most farmers of rotations which allow cropped land to revert to ley land for one or more years before being fallowed in preparation for the next crop. Improved pasture species are frequently sown with crop preceding the ley land phase.

These changes have been most marked in the eastern section of the survey area where climatic conditions favour the growth of subterranean clover. More farmers are incorporating extended ley land periods into their rotations here than in the western section. With the adoption of wider crop rotations, farmers no longer have an incentive to burn stubble, and this practice has almost ceased in the area.

The increasingly severe skeleton weed infestation engendered by frequent cropping has made the adoption of wider crop rotations technically necessary on many farms. Wider rotations and the encouragement of the growth of legumes are also highly desirable for the maintenance of soil fertility.

The high prices which farmers have received for their products in recent years, and the rise in wool prices relative to wheat prices have enabled farmers to make these changes without any immediate reduction in their incomes.

Although the reduction in the wheat acreage that has occurred in recent years can in large measure be attributed to the reasons given above, it is partly due to various other circumstances. Among the most important are the shortage of labour and the difficulty of obtaining supplies of superphosphate, bags, machinery and machinery parts.

In 1951 the coincidence of a number of other circumstances accentuated the downward trend in the area sown to wheat. These circumstances were:—

1. The phenomenal rise in wool prices which occurred last year. The increased profitabilily of grazing which resulted, probably accounts, to a large extent, for the disproportionate reduction in wheat sowings which occurred in Illabo A riding, where the majority of farmers interviewed ran merino sheep.

2. Adverse seasonal conditions during the fallowing period, which caused a considerable reduction in sowings.

3. The difficulties encountered by farmers in harvesting the previous crop, due to heavy skeleton weed infestation.

4. The lack of adequate fodder reserves on most farms partly accounted for an increase in the area sown to oats. This increase was obtained at the expense of wheat acreages.

Several of the important factors which contributed to last year's spectacular decline in wheat acreages were of a temporary nature and have now ceased to operate. (It should be noted, however, that although wool prices have fallen this season by approximately 50 per cent. compared with last season's level, wool growing remains a very profitable enterprise.) However, the importance of the agronomic considerations which played a major part in causing farmers to grow less wheat will remain undiminished for a number of years, at least. Accordingly, although it is reasonable to expect some recovery in the area sown to wheat this year in the survey area, wheat sowings are likely to remain at a relatively low level, compared with areas sown in pre-war and early post-war years.

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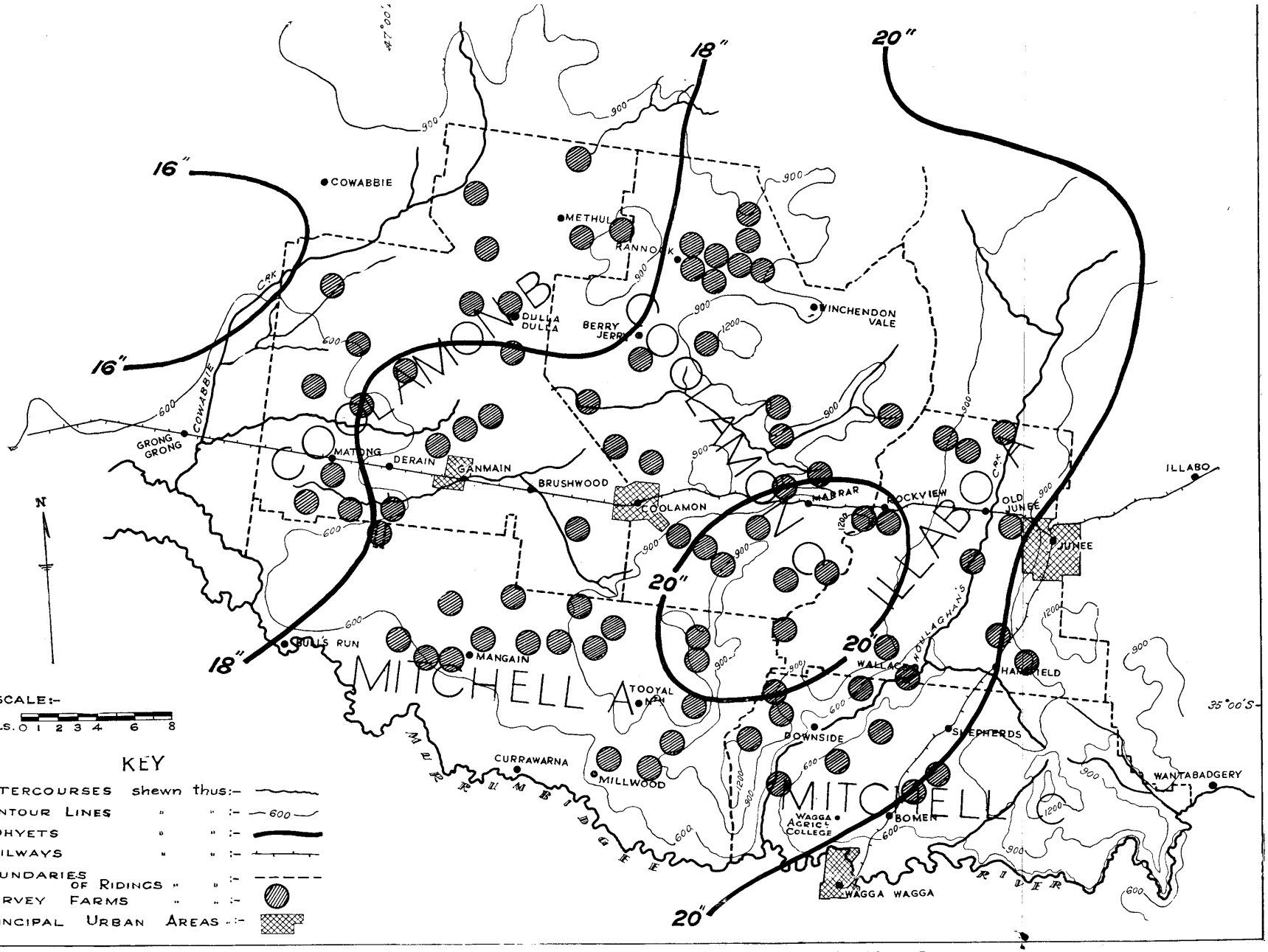

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Fig. 1.—Map of Survey Area, showing Topography, Rainfall, Boundaries of Ridings, and Location of Survey Farms.

To be inserted between pages 8 and 9.