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PASTURE IMPROVEMENT IN THE SOUTH-WEST SLOPE

by

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1. SUMMARY AND CONCLUSIONS

The survey on which this report is based sought information concerning grazing properties in the eastern portion (Gundagai, Tumut, Tumbarumba, Holbrook and part of Kyeamba shires) of the Southern Agricultural Region. Information concerning this particular type of property in this particular portion of the South-west Slope is not readily obtainable from published statistics.

One hundred and fifty, or one-sixth, of the grazing properties in the survey area were visited in the course of the survey. To the extent to which it is possible to test the accuracy of our findings against statistics relating to *all* properties in the survey shires, our sample appears to reveal, with a fairly high degree of accuracy, the situation on grazing properties in the area as a whole. However, it does not reveal the position in individual shires nearly so accurately.

In this report the state of property development and improvement, and the scope for future development and improvement are discussed.

Property Development and Improvement

On the basis of the opinions of the 150 graziers interviewed, the types of property improvement most urgently needed in the survey area were, in order of importance, sowing pastures, topdressing, clearing, subdivision and buildings.

There is little room for disagreement with this assessment of the situation, as the body of this report—which is summarised on the pages which follow—will show.

Pasture Improvement

Approximately 80 per cent of the land in grazing properties was suitable for pasture improvement, either immediately or after further clearing. Of this suitable land approximately 40 per cent (or 34 per cent of the total area) had been sown to pasture.

About 67 per cent of the total area was suitable for pasture improvement *without* further clearing, and about half of this area had been sown.

Thus the 1954 area of improved pasture could be doubled, without further clearing being required. Additional areas, amounting perhaps to almost half the present area, could be sown if they were further cleared. In addition there is room for improvement of existing stands of sown pasture.

Five per cent of the survey properties had no improved pasture at all. Almost a third had less than 20 per cent of their improvable area under sown pasture. Sixty per cent had sown half or less of their improvable area.

At the time of the survey graziers planned to make pasture sowings in the three years, 1955-57, which would bring about a 42 per cent increase in the sown area. Published statistics show that in the three years prior to the survey, the area of sown pastures in the survey shires increased by 45 per cent.

A follow-up survey, carried out early this year—and reported in detail elsewhere in this issue¹—shows that there has been a slowing down in the rate of property development and improvement, and that the increase in the sown area is likely to be less than the above figure.

Topdressing

The most common rate of application of superphosphate to improved pasture was between 90 and 112 lb. per acre per annum. About one-fifth of the graziers used quantities greater than 112 lb. and official statistics reveal a recent trend toward the use of heavier topdressings.

Clearing

Graziers estimated that approximately 22 per cent of the land they own would benefit from, and be worth further clearing. Two-thirds of this land had already been partly cleared.

At the time of the survey, they planned to clear or partly clear 35 per cent of this land in the three years 1955-57. However, since then they have revised these plans, and less clearing will actually be carried out.

Subdivision

It is estimated that at least 80 per cent of the land in the survey holdings is in paddocks larger than 100 acres. However, graziers planned to increase the amount of subdivisional fencing on their properties by 32 per cent in the three years, 1955-57, but these plans have since been revised, and an increase of no more than 20 per cent is now likely.

¹ See F. H. Gruen, "Wool Prices, Credit Restrictions and Development", pp. 61-73.

Buildings

About half of the survey properties lacked two *or more* of the following five types of structures: a shearing shed, a hay shed, a machinery shed, a sheep dip, a set of sheep yards. One-quarter of the holdings possessed all five.

Of the more essential types of building the one most frequently lacking on survey properties was a hay shed: 45 per cent of properties did not have one.

All but 25 per cent of the graziers had their own shearing shed, whilst special accommodation for employees was provided on 41 per cent of properties.

Sixty per cent of graziers planned to build one or more new sheds in the period 1955-57. The most commonly planned addition was a hay shed, the next most common, a shearing shed. If these plans are put into effect, the percentage of properties lacking a hay shed will fall from 45 to 30, and the percentage lacking a shearing shed will fall from 25 to 15.

Machinery

Approximately half of the survey properties lacked two or more of the following six important types of machinery: a shearing or crutching plant, a tractor, a truck or utility, a superphosphate spreading machine (of any kind), a mower or binder, a hay baler. All six were found on about a fifth of the properties.

Almost 30 per cent of the graziers had no haymaking equipment.

The following items—a shearing or crutching plant, a tractor, a superphosphate distributor—each considered individually, were found to be lacking on a fifth of the properties.

Fodder Conservation

Thirty per cent. of the graziers had no conserved fodder on hand in 1954.

The average quantities of fodder conserved in the area as a whole per 100 sheep equivalents were 1.78 tons of hay, 14 bushels of grain and 0.10 tons of silage. These quantities are very low.

Approximately half the graziers who were without fodder at the time of the survey plan to conserve some by 1958. This leaves approximately 15 per cent of graziers without conserved fodder, and with no apparent plans for conserving any.

Conclusions

The major conclusions to be drawn from this survey are as follows:—

1. Stimulated by good prices, high incomes and favourable seasons, graziers in the eastern portion of the South-west Slope have, in the last five years, rapidly improved and developed their properties.
2. The most significant development has been the expansion of the areas sown to improved pasture and topdressed with superphosphate.

3. Investment in clearing, subdivision, buildings and plant has also been running at a high level.
4. Despite the rapid rate of development, there is still ample scope for further improvement of properties in the area. The area of improved pasture could be doubled, without further clearing being required, but even if no further expansion eventuated, much investment—particularly in subdivisional fencing and stocks of conserved fodder—is needed to gain the full advantage of the pasture improvement already carried out.
5. Practically all graziers now appear to be alive to the value of pasture improvement. However, the adoption of methods of pasture and stock management appropriate to the new grazing conditions does not appear to have kept pace with the increasing use being made of improved pastures. This suggests that at the present time research and extension work should concentrate on such aspects of pasture and stock management as topdressing policies, introduction of new species into clover-rye pastures, rotational grazing, supplementary feeding, fodder conservation and improving sheep quality.
6. At the time of the survey (late 1954, early 1955), graziers planned to make investments which would have meant a continuing high rate of improvement and development. However, from information obtained in a follow-up survey carried out early in 1956, it appears that plans for new investment have been and will be considerably curtailed, owing to the fall in wool prices since 1954-55.

2. INTRODUCTION

This article reports further findings of the survey of South-west Slope grazing properties, which was carried out in late 1954 and early 1955, and of which some account has already appeared in this *Review*. The earlier article described the region and the properties in a general way, and gave details of stock management practices and of the composition of the sheep and cattle population. This report is mainly concerned with the state of property improvement and development in the area and with the scope for further development.

Details of the area covered by the survey and of the sampling methods employed were given in the earlier article, but, briefly stated, this information is as follows:—

- (i) The survey was conducted in Gundagai, Tumut, Tumbarumba and Holbrook Shires, and in the eastern part ("C" Riding) of Kyeamba Shire, "B" Riding of Tumut and "C" Riding of Tumbarumba Shire were excluded, since they contain a high proportion of rough mountainous country which contributes little to the production of the area. These shires all lie within the South-west Slope's statistical division and constitute the eastern portion of the Southern Agricultural Region.

- (ii) A random sample of 150 grazing properties, comprising about one-sixth of the grazing properties in the area, was covered by the survey.

It should perhaps be made clear that the survey sample does not purport to be representative of the *whole* of the eastern grazing areas of the Southern Agricultural Region—as noted above, much of the rougher country was deliberately excluded—nor is it representative of *all* properties in the area covered. It does, however, purport to be representative of grazing properties, if the following two criteria be accepted as defining a grazing property:—

- (a) Seventy-five per cent. of the operator's income to be derived from the sheep and cattle enterprises (excluding dairying).
- (b) *Either* an area of 500 acres, *or* a stocking rate of 500 dry sheep (or their equivalent).

Reliability of the Sample

Since the sample is intended to be representative of a certain type of property in certain parts of the survey shires, it is difficult to check the accuracy of the survey findings against official statistics, which refer to all rural holdings (of one acre or more) and which are only available on a whole shire basis. Some idea of the difference between the two groups is given by the fact that whereas the State Statistician reports 381 "rural holdings" in Gundagai Shire, reference to the shire rate books reveal only 204 "grazing properties" as defined above. Corresponding figures for Holbrook Shire are 261 and 216 properties; for Tumut Shire, over 600 and 162; and for Tumbarumba, 370 and 162.

Despite these differences, it is possible to obtain from published statistics some sort of a check on the representativeness of the sample. It should be fairly representative in respect of sheep numbers, since the bulk of the sheep are carried on grazing properties, as defined above. In Table I, the statistician's estimate of sheep numbers is compared, for four shires, with an estimate obtained by multiplying by six the sheep numbers on the survey properties. It will be seen that, for the four shires considered together the survey estimate is very close to the statistician's estimate (it is within four per cent of it) but that there are larger discrepancies within individual shires. (There is a particularly large discrepancy in Tumbarumba Shire). When the proportion of wethers to total sheep on the survey properties is compared (in Table II) with the proportion in the total sheep population as reported to the statistician it is seen that in two shires the proportions are practically the same, in the other two shires there are wide discrepancies, while, for the four shires, there is a moderate discrepancy. However, the sample and the statistician agree in giving Tumut Shire the highest proportion of wethers and Tumbarumba Shire the lowest proportion.

In general it would appear that the survey findings give a fairly accurate picture, so far as the survey area as a whole is concerned, but that they are much less reliable in describing the situation in individual shires. For that reason, shire by shire comparisons will be avoided for the most part in this report.

² Ross Parish and J. L. Dillon, "The Grazing Industry in the South-West Slopes", this *Review*, Vol. 23, No. 2 (June, 1955), pp. 59-82.

TABLE I
Comparison of Survey Findings with Published Statistics
Total Number of Sheep

Shire.	Total Number of Sheep		
	Statistician's Figures (as at 31st March, 1955)	Survey Estimate (as at Shearing, 1954)	Survey Estimate as Percentage of Statistician's Figure
	'000	'000	Per cent
Gundagai	692	641	93
Holbrook	426	372	87
Tumut	353	308	87
Tumbarumba	309	386	125
Four Shires	1,779	1,707	96

TABLE II
Comparison of Survey Findings with Published Statistics
Proportion of Wethers

Shire	Proportion of Wethers to Total Sheep	
	Survey	Statistician
	Per cent	Per cent
Gundagai	31.4	31.7
Holbrook	20.2	31.3
Tumut	39.4	38.0
Tumbarumba	12.8	20.8
Four Shires	26.2	32.2

3. PROPERTY IMPROVEMENT AND DEVELOPMENT

Graziers' Opinions

Graziers' opinions regarding the types of improvement needed on their properties, and which types were needed most urgently, are recorded in Table III. On the basis of their opinions, the most urgently needed improvements are, in order of importance,

sowing pasture
topdressing
clearing
sub-division
buildings.

A more detailed study of the situation with respect to the different types of improvement—to be presented in the following section of this report—confirms, in broad terms, the graziers' assessment of the position.³

³ See also Gruen, *op. cit.*, p. 64.

TABLE III
Scope for Development on Survey Properties

Type of Improvement	Proportion of Graziers Who Considered Each Improvement Was :	
	Needed	Urgently Needed
	Per cent	Per cent
Sowing Pasture	85	63
Topdressing Pasture	83	32
Subdivision	58	18
Clearing	53	21
Buildings	43	7
Water Supplies	33	7
Soil Conservation	27	3
Plant	25	2
Livestock Improvement	18	1

As would be expected, landowners considered that the most widely and urgently needed improvement is the sowing and topdressing of improved pastures. Next in order of importance were subdivision and clearing. These owe their importance largely to the increases in carrying capacity which pasture improvement brings about. The knowledge that land can be pasture improved raises its value considerably, and hence makes clearing more worthwhile, and land cleared for grazing often needs further clearing to enable it to be more easily topdressed or renovated. The need for further subdivision arises from the increased sheep density per acre on improved pastures. Higher stocking rates also mean greater water requirements, but as many parts of the survey area are well watered by streams, it is not surprising that improved water supplies were not an urgent need on most properties.

The fairly high ranking given to the need for new buildings probably reflects the fact that their construction had been hampered, until fairly recently, by shortages of materials and skilled labour. Due to shortages, both plant and buildings deteriorated considerably during the war and immediate post-war years. Since then new plant appears to have taken precedence over new buildings, partly because machinery supplies became available more quickly and partly because the need for plant was more urgent (it is easier to make do with old buildings than with worn-out plant). Thus, at the time of the survey few graziers claimed that they urgently needed more plant and they appeared to have turned their attention to improving and adding to their buildings.⁴

Over the greater part of the survey area soil erosion is not a major hazard, so that its low ranking is not surprising. We may quibble, however, with the low ranking given to livestock improvement—even though this may be due to the fact that it was the last item on the list of

⁴ However, as will be pointed out below (p. 98), graziers actually bought twice as much plant in 1955 as they said they intended to buy.

possible improvements mentioned to the graziers. It may not be an urgent need, if for no other reason than that it is a slow process, but without doubt there is greater scope for improving sheep and cattle quality than graziers' answers indicate.

Pasture Improvement, Actual and Potential

In measuring the area of improved pasture and the scope for further improvement that exists on the survey properties, we have relied mainly on the *paddock record* obtained for each property. In this record, each paddock was described in terms of area, degree of clearing, degree of slope and type of pasture. Three stages of clearing—"for the plough", "for grazing" and "uncleared"—and three degrees of slope—"suitable for cultivation", "suitable for renovation" and "too steep for renovation"—were distinguished. These categories are admittedly not very precise and are likely to have been interpreted rather differently by different graziers. Opinions will differ as to what constitutes the maximum degree of slope compatible with cultivation or renovation. Land "cleared for grazing" is a very heterogeneous category, since it includes land in all degrees of clearing between fully-cleared and uncleared land, and which may, or may not, require further clearing. (The paddock record therefore does not provide an adequate measure of the amount of additional clearing that may be needed, but separate estimates of this quantity were obtained from the graziers.) Another source of error in our estimates is the fact that it was found impracticable to obtain a paddock-by-paddock record from some of the larger properties, the interviewers having to be content with cruder overall estimates of the areas of the different classes of land. Nevertheless, we feel that the summation of the paddock records provides a reasonably accurate picture of the types of land found on the survey properties and thus constitutes a suitable basis for estimates of production potential.

The paddock records have been used mainly to estimate the area of pasture improved land and the area that was suitable for pasture improvement. The relevant figures are presented in Table IV. All land that was not too steep for renovation and which was at least cleared for grazing has been regarded as suitable for pasture improvement (column (b)). In addition, as a check on the paddock record data, graziers were asked for an overall estimate of the area of unimproved land that could have been improved immediately (column (c)). It will be observed that in four shires these estimates are slightly smaller than the area calculated from the paddock records (column (d)). This difference is to be expected as there are often small pockets of "difficult" land in areas that are otherwise suitable for cultivation or renovation. However, in the case of Kyeamba Shire the discrepancy between the two estimates is too large to be explained in this way. It appears that in this shire a considerable area of land that was cleared for grazing still required further clearing to render it suitable for pasture improvement.

Graziers were also asked for an estimate of the amount of land too heavily timbered to be pasture improved, but which could be improved after further clearing (column (j)). These figures were sought as a

TABLE IV
Classification of Land in Terms of its Suitability for Pasture Improvement

Shire	Total Area <i>a</i>	Area Suitable for Pasture Improvement <i>b</i>	Area of Improved Pasture <i>c</i>	Area Available for Immediate Pasture Improvement (<i>b</i> — <i>c</i>) <i>d</i>	Graziers' Estimate of <i>d</i> <i>e</i>	Area Unsuitable For Pasture Improvement			Graziers' Estimate of Area Suitable for Pasture Improvement if Further Cleared <i>j</i>
						Too Steep <i>f</i>	Uncleared <i>g</i>	Total (<i>f</i> + <i>g</i>) <i>h</i>	
Tumbarumba	Acres 39,451	Acres 29,745	Acres 20,125	Acres 10,640	Acres 7,539	Acres 7,369	Acres 2,337	Acres 9,706	Acres 9,160
Kyeamba	...	...	...	...	...	...	...	...	...
Tumut...	Acres 47,512	Acres 39,972	Acres 16,530	Acres 23,442	Acres 13,102	Acres 6,155	Acres 1,385	Acres 7,540	Acres 6,990
Holbrook	Acres 50,278	Acres 29,333	Acres 11,375	Acres 17,958	Acres 17,358	Acres 16,022	Acres 4,923	Acres 20,945	Acres 7,480
Gundagai	Acres 53,220	Acres 46,922	Acres 23,576	Acres 23,346	Acres 19,787	Acres 4,479	Acres 1,819	Acres 6,298	Acres 6,102
Five Shires	Acres 85,376 (67,076)*	Acres 56,656 (44,856)*	Acres 21,039 (16,039)*	Acres 35,617 (28,817)*	Acres 31,953 (30,953)*	Acres 22,750 (19,250)*	Acres 5,970 (2,970)*	Acres 28,720 (22,220)*	Acres 19,450 (4,150)*
	275,837	202,628	92,645	109,983	89,739	56,775	16,434	73,209	49,182

* Brackets totals : one large station property excluded.

check on the paddock category, "uncleared but not too steep for renovation" (column (g)). However, in all shires the graziers' estimate substantially exceeded that derived from the paddock record. In fact, in three shires the graziers' estimate was close to the *total* area unsuitable for pasture improvement (column (h)) whether on account of lack of clearing or steepness. Thus either the graziers have underestimated, or the paddock record has overestimated the area of steep land. The greater error probably lies in the paddock record: since uncleared land is most frequently found on the steeper slopes, graziers probably tended to classify it as "uncleared and too steep for renovation", even though it could in fact have been renovated if cleared, that is, they probably took a relative view of steepness and put their steepest land into the "too steep" category. It will be observed that the greatest relative discrepancies between columns (h) and (j) occurred in Tumut and Gundagai Shires, i.e., the shires which are known to contain the highest proportion of steep and rugged country. The difference between the graziers' estimates and the paddock record is also partly due to the fact that a few graziers took account of the possibilities of aerial topdressing. The outstanding example of this was given by one large station property in the Gundagai Shire. If this property is excluded, the bracketed totals apply to Gundagai Shire, in which case the discrepancy is much smaller.

The data from Table IV are given in the more useful form of percentages in Table V. It will be seen that for the area as a whole, between 73 and 85 per cent of land in grazing properties was suitable for pastoral improvement, either immediately or after further clearing.⁵ Something more than 40 per cent of this suitable land (or 34 per cent of the total area) had been improved. Excluding land that required further clearing, about 67 per cent of the area was suitable for pasture improvement and roughly half of this area had been sown. Tumbarumba Shire led in the proportion of suitable land improved (approximately 60 per cent), followed by Holbrook and Kyeamba Shires (between 45 and 50 per cent), while Tumut and Gundagai Shires had the smallest proportion (a little more than 30 per cent).

From the point of view of production potential, the main implication of these findings are:—

- (i) The area under improved pasture in 1953-54 could be doubled without further clearing being required.
- (ii) Additional areas, possibly amounting to as much as half (or as little as one-sixth) of the 1953-54 acreage could be improved provided they were cleared further.

The estimates of area of improved pasture given in Tables IV and V have a major limitation in that they take no account of the differing qualities of pasture stands. They include all pastures regarded by their

⁵ There has been some controversy concerning the proportion of land in New South Wales that is suitable for pasture improvement. (See F. H. Gruen, "Superphosphate Use in New South Wales", this *Review*, Vol. 23, No. 1 (March, 1955), p. 22.) Gruen has estimated that in the South-west Slope as a whole (but excluding Bland Shire) about 60 per cent of the land in rural holdings is suitable for pasture improvement without further clearing being required. This survey shows that in the area covered—which includes much of the more elevated portion of the slopes, but excludes the really mountainous parts—about 67 per cent of the land is suitable.

TABLE V
Pasture Improvement, Actual and Potential

Shire	Proportion of Total Area Pasture Improved	Additional Proportion Available for Pasture Improvement					Proportion of Total Area Suitable for Pasture Improvement†		Proportion of Suitable Area at Present Pasture Improved‡	
		Immediately		If Cleared		Total	A	B	A	B
		I*	II†	I*	II†	I*				
Tumbarumba	Per cent 51	Per cent 24	Per cent 19	Per cent 6	Per cent 23	Per cent 30	Per cent 76	Per cent 93	Per cent 67	Per cent 55
Holbrook ...	44	44	37	3	11	47	84	92	52	48
Kyeamba ...	35	49	28	3	15	52	66	78	53	45
Tumut ...	23	35	35	10	15	45	68	73	34	32
Gundagai ...	25	41	37	7	23	48	69	85	36	29
	(24)§	(43)	(46)	(4)	(6)	(47)	(74)	(76)	(32)	(32)
Survey Area	34	39	33	6	18	45	73	85	47	40

* I Estimate based on paddock records.

† II Graziers' estimate.

‡ "A" estimate is based on the *paddock record* estimate of the area of land available for pasture improvement if cleared, whereas the "B" estimate assumes that the *graziers'* estimate of this area is correct. Both "A" and "B" estimates assume that the *graziers'* estimate of the area of land immediately available for pasture improvement is the correct one.

§ Bracketed figures exclude one large property.

owners as having been improved, whether by means of sowing or broadcasting seed, or through self-generation under the stimulus of topdressing. In many of these areas improved species were probably only weakly established or had been allowed to run down. Thus, in addition to scope for extending pasture improvement over wider areas, there is room for the more intensive improvement of existing sown-pasture stands. No estimate of the potential gains in this direction is possible, but they are certainly considerable.

It should also be noted that the application of pasture improving techniques over wider areas will be attended by less dramatic increases in carrying capacities than have been achieved in the past, for the reason that the better land tends to be improved first. The land that remains to be improved is, on the average, less fertile, steeper and rougher than that already sown to pasture.

Past Trends in Area of Improved Pasture

Official statistics of the area of sown grasses and clovers are published on a shire basis. The figures have been used to compile Table VI which shows trends since 1925-26 in the area of improved pasture in four of the survey shires.⁹ From small beginnings in the middle twenties the area of sown pastures expanded at first slowly and then fairly rapidly during the late thirties. This expansion was halted during the war and immediate post-war period when superphosphate was in very short supply, but resumed again in the late forties and has continued to date.

In the survey area pasture improvement first got under way in Tumbarumba Shire, where a period of rapid expansion occurred in the late thirties. In Tumut and Holbrook Shires moderately rapid increases in the sown area took place in that period, but only a small expansion occurred in Gundagai Shire. Since about 1949-50, much the same rate of expansion appears to have taken place in all shires as occurred in Tumbarumba Shire in the pre-war period. By 1954-55, Gundagai Shire appeared to have attained approximately the same degree of pasture improvement as had been achieved in Tumbarumba by 1939-40.

Degree of Pasture Improvement of Properties

There was great variation between properties with respect to their degree of pasture improvement. Properties are classified in Table VII by shires according to the proportion of suitable land pasture improved. Five per cent had no improved pasture at all, and the largest single concentration (29 per cent) was found in the 0-20 per cent improved category. Apart from this, the properties were fairly evenly distributed among the other categories. More than half (60 per cent) of the holdings had half or less of their improvable area sown to pasture.

On the average, there were large differences between shires in the proportion of land which had been pasture improved. Gundagai and Kyeamba survey properties had the lowest proportion of improved pasture whilst Tumbarumba had the highest. However, in each shire in the survey sample there were some properties which had no or very little improved pasture and others which had all suitable land improved.

⁹ Kyeamba Shire has been excluded because only a small part of this shire was included in the survey area.

TABLE VI
Area of Sown Grasses by Shires

Period	Tumbarumba		Hollbrook		Tumut		Gundagai		Total	
	Acres	Index*	Acres	Index*	Acres	Index*	Acres	Index*	Acres	Index*
1954-55	98,496	247	105,272	623	83,400	744	65,083	903	352,251	469
1953-54	86,769	218	85,972	509	77,633	693	51,792	719	302,166	402
1952-53	79,371	199	66,560	394	58,742	524	41,955	582	246,628	328
1951-52	79,247	199	63,739	377	65,599	585	37,204	516	245,789	328
1950-51	71,231	179	52,279	310	53,393	476	35,740	496	212,643	283
1945-46 to 1949-50†	56,425	142	40,119	238	42,053	375	18,437	256	157,034	209
1940-41 to 1944-45†	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1935-36 to 1939-40†	39,829	100	16,885	100	11,206	100	7,205	100	75,125	100
1930-31 to 1934-35†	13,138	33	4,183	25	3,799	34	2,695	37	23,770	32
1925-26 to 1929-30†	4,198	10	3,496	21	2,022	18	998	14	10,714	14

* Using five-year period 1935-36 to 1939-40 as base.

n.a.: Not available.

† Five year averages.

Source: Figures supplied by the N.S.W. Bureau of Statistics and Economics.

TABLE VII
Survey Properties Classified by Degree of Pasture Improvement

Shire	Percentage of Suitable Land Pasture Improved*					
	0	1-20	21-40	41-60	61-80	81-100
	Per cent of Prop- erties	Per cent of Prop- erties	Per cent of Prop- erties	Per cent of Prop- erties	Per cent of Prop- erties	Per cent of Prop- erties
Tumbarumba ...	...	11	7	15	41	26
Holbrook ...	3	28	14	19	14	22
Kyeamba ...	...	23	35	19	8	15
Tumut ...	7	19	11	37	15	11
Gundagai ...	15	35	9	12	20	9
Survey Area ...	5	24	15	20	19	17

* Includes land requiring further clearing, as well as land immediately available for pasture improvement.

Types of Improved Pasture and Methods of Establishment

The bulk (94 per cent) of the improved pasture established in the survey area was composed of a mixture of subterranean clover and rye grass. Four per cent of the sown area contained other species, such as phalaris, cocksfoot, white clover and paspalum, in addition to clover and rye. The remaining two per cent was made up of lucerne.

The relative proportions of these pasture types will probably not change greatly in the immediate future. In the longer run, stands containing species such as phalaris, cocksfoot and paspalum will become more important. This development of "balanced" pastures will be a natural consequence of the raised fertility status of the soils in the survey area as the subterranean clover fulfils its function. At present the use of such species as phalaris and cocksfoot in combination with subterranean clover and rye is virtually restricted to Tumbarumba Shire. Some of the Tumbarumba graziers were already thinking of "balanced pastures" consisting of phalaris, cocksfoot, grazing oats with white and red clover instead of subterranean clover.

Lucerne was popular only on river flat country and was thus confined to Kyeamba and Gundagai Shires.

Forty-two per cent of the improved pasture area had been sown on a prepared seed bed whilst 10 per cent had been established with limited cultivation. Broadcasting of seed and superphosphate had accounted for the establishment of one-third of the sown area. A fairly high proportion (15 per cent) of the total area had established itself by spreading naturally from adjacent areas under the stimulus of topdressing. On most properties at least two of these four methods had been used. Since the land not yet improved is probably rougher than average it is likely that future establishment of new pasture areas will be mainly by broadcasting and limited cultivation.

At the time of the survey 22 per cent of those operators who had improved pasture were following a rotational plan of pasture renovation or renewal, the most popular being to renew pasture after it had

been down for six years. In addition, another 24 per cent of operators intended to follow a renewal programme after they had completed their plans for establishing original pasture stands.

In establishing improved pasture 82 per cent of the graziers used certified seed, and 24 per cent inoculated their clover seed with rhizobium before sowing.

Planned Pasture Sowings

Landowners were asked whether they planned to sow additional areas to improved pasture in 1955 and in the three-year period, 1955-57. If these plans were carried out, a 17 per cent increase in sown area would have occurred in 1955, and a 42 per cent increase by 1957.

These increases may appear large, but they are not out of line with rates of increase which have been achieved in the past. Official statistics (Table VI) show that in the three-year period, 1952-53 to 1954-55, the area under sown grasses in the five survey shires increased by 45 per cent over the 1951-52 acreage. The fact that this rate of increase took place immediately prior to the survey suggests that it is not unlikely that a similar rate would be maintained in the years immediately following the survey.

One can be certain that for various reasons, a number of graziers will be unable to implement their plans in full. On the other hand, in a number of cases no definite statement was obtained as to whether additional areas would or would not be sown, and in other instances only a general intention to sow, with no details of acreages, was recorded. It is likely that a number of graziers in these categories would, in fact, sow some pasture in the period, and these sowings would tend to offset any under-fulfilment of plans.

Fortunately, it has been possible to check on the extent to which intentions to sow in 1955 have been realised. This was made possible through the follow-up survey, carried out in February, 1956 (i.e., approximately 15 months after the original survey) in which half of the original sample of landowners was interviewed.

It was found that those interviewed in 1956 had, in total, sown no more than 70 per cent of the area intended. This does not necessarily mean that when originally interviewed, many graziers deliberately or unconsciously overstated their plans. (The fact that the survey was conducted by the Department of Agriculture, a body known to advocate strongly pasture improvement, does, however, provide a motive for such overstatement.) Other factors may have intervened between the time when the intentions were stated and the time for them to be carried out. The most obvious factor to consider is seasonal conditions: 1955 was a wet year and this, no doubt, hampered pasture sowing. Another factor was the shortage of superphosphate. In 1954-55, manufacturers accepted superphosphate orders which they later found they were unable to fulfil, at least, not without considerable delay. Declining wool prices may also have caused some revision of plans. It is, of course, impossible to arrive at any numerical estimate of the effects of these factors. Provided the follow-up sample was reasonably representative of the original sample, the sown pasture area increased in 1955 by about 12 per cent, not the 17 per cent suggested by the original survey. It will be noted that if an annual increase of this order was to be maintained until 1957,

the increase in the three-year period would not be much below the 42 per cent suggested by the survey results and supported by extrapolation of the past trend, as revealed by official statistics. However, as Gruen points out in his report on the follow-up survey⁷, the decline in wool prices that has occurred since the original survey was carried out has caused a slowing down in the rate of investment in property improvement and development and, although graziers are probably cutting down less on pasture improvement than on other investments, the rate of increase in the sown area is likely to be appreciably reduced.

Topdressing

The use of superphosphate is the key to pasture improvement in the area. It is applied when sowing the introduced grasses and clovers, and thereafter annual topdressings are usually made to stimulate growth and maintain and improve the proportion of exotic species in the pasture stand. Topdressing by itself will encourage the growth of the naturally-occurring legumes and stimulate the spread of improved species from sown to unsown areas. Both sowing and topdressing usually take place in the autumn. Little experimental evidence as to how pasture growth responds to varying rates of superphosphate application is available, but what information there is shows that in many localities it would be profitable to apply superphosphate at much higher rates than have been customary in the past. In the survey area the most common rate of application was between 90 and 112 lb. per acre per annum. As Table VIII shows, 64 per cent of those supplying the information reported applications within this range. However, a significant minority, composed mainly of graziers in Tumbarumba and Holbrook Shires were using heavier topdressings. Of the 21 men in this group 13 were using 180 lb. per annum, two 224 lb. and one 336 lb. A few graziers were applying heavy initial dressings of from 180 to 336 lb. for from one to four years, then reverting to a rate of 90 or 112 lb.

TABLE VIII
Rates of Application of Superphosphate

Rate of Application	Tumbarumba	Holbrook	Kyeamba	Tumut	Gundagai	Survey Area	
	Number of Properties						Per cent
Less than 90 lb.	2	1	4	6	6	19	17
More than 90, but less than 112 lb.	5	14	9	5	9	42	38
112 lb.	4	9	3	8	5	29	26
More than 112 lb.	8	5	3	3	2	21	19

The above comments, and Table VIII, are based on graziers stated topdressing policies. However, it is rare that such a policy is adhered to rigidly. The amount of superphosphate each year depends on seasonal conditions, the existence or absence of superphosphate shortages, economic conditions and prospects, and other factors. It was therefore

⁷ See pp. 64-66.

thought desirable to check stated topdressing rates against apparent rates as calculated from the recorded amounts of fertiliser purchased, and the area of improved pasture. Although some very large individual discrepancies were evident, the correspondence between the two ratios was in most cases quite good. Also, overall superphosphate usage was consistent with the stated rates, taking into account the area of sown pasture.

Average rate of application of superphosphate to pasture can be calculated for the survey shires from official statistics. These rates are given in Table IX. (It should be noted that the rates refer to average quantities used on all pastures, i.e., natural as well as improved.) The most interesting feature of these figures is the quite marked increase in the average rate of application in 1953-54 and 1954-55—particularly in the latter year. This increase may in part reflect an easing of the shortage of superphosphate in those years^a—but it is more likely to be due to a more widespread appreciation of the benefits of heavy topdressings.

TABLE IX

Average Rate of Application of Superphosphate Applied to Pastures

Years	Holbrook	Gundagai	Tumut	Tumbarumba	Four Shires
	cwt./acre	cwt./acre	cwt./acre	cwt./acre	cwt./acre
1954-55	1.02	1.04	1.01	1.06	1.03
1953-54 ... ..	.88	.89	.97	1.00	.94
1948-49—1952-53 ...	.81	.86	.92	.96	.90
1935-36—1939-40 ...	.88	.87	.96	.92	.91

Source: Based on figures supplied by the N.S.W. Bureau of Statistics and Economics.

Trends in Superphosphate Consumption

Table X, which shows quantities of superphosphate applied to pastures in four of the survey shires, from 1925-26 to 1954-55, has been compiled from official statistics. The table clearly shows the spectacular increase in fertiliser usage since the war, and particularly in the five years ended 1954-55. The greatest proportionate increase has occurred in Gundagai Shire, where least pasture improvement had been carried out, and where consequently the greatest scope for a rapid increase existed.

A slowing down in the rate of increase of superphosphate consumption, and even a possible slight reduction in total consumption in 1956-57, was indicated by the follow-up survey. These possible developments are discussed elsewhere in this issue (see p. 69).

^a However, some evidence was obtained on the survey that the more usual response to the shortage was to reduce the area topdressed, rather than the rate of application.

TABLE X
Superphosphate Usage by Shires

Period	Tumbarumba		Holbrook		Tumut		Gundagai		Total	
	Cwt.	Index*	Cwt.	Index*	Cwt.	Index*	Cwt.	Index*	Cwt.	Index*
1954-55	101,113	355	102,779	332	79,394	266	71,329	681	354,615	351
1953-54	93,806	317	70,424	227	71,276	239	47,709	445	283,215	280
1952-53	87,629	296	58,030	187	64,048	215	33,186	317	242,893	240
1951-52	88,188	298	62,023	200	57,390	192	22,297	213	229,898	227
1950-51	67,793	229	53,065	171	46,210	155	18,208	174	185,276	183
1945-46 to 1949-50†	41,784	141	30,564	99	42,093	141	11,436	106	125,877	124
1940-41 to 1944-45†	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1935-36 to 1939-40†	29,577	100	30,953	100	29,846	100	10,746	100	101,122	100
1930-31 to 1934-35†	4,022	14	2,943	7	1,502	5	787	7	8,354	8
1925-26 to 1929-30†	2,042	6	3,185	10	550	2	499	5	6,276	6

* Using five-year period 1935-36 to 1939-40 as base.

† Five-year averages.

n.a.: Not available.

Clearing

Among the methods of improving and developing their properties, graziers ranked clearing next to pasture improvement in degree of urgency. At least a half of the holdings contained land that, in the owner's opinion, was worth further clearing. This land constituted 22 per cent of the total area of all holdings. It was made up of 8 per cent virgin forest land, and 14 per cent of land already partly cleared. Much of this partly cleared land, though suitable for grazing, required further clearing to enable it to be pasture improved without undue inconvenience. Some of it, however, had already been pasture improved, but presumably could have been more intensively improved with further clearing.

It is noteworthy that a large proportion of the land which required further clearing was found on the bigger properties: 70 per cent of the total area worth clearing was found on 25 per cent of the holdings having such land, and 66 per cent of the clearing planned for 1955-57 was to be carried on these holdings. Thus, the larger properties were keeping pace with the smaller with regard to further clearing. Many of these larger properties are situated in the more rugged country. Before the advent of pasture improvement, it probably would not have paid the owners to clear them to the extent now contemplated.

In their plans graziers envisaged clearing or partly clearing about 30 per cent of the forest land in the period 1955-57, and clearing further about 40 per cent of the partly-cleared land. They were thus concentrating attention on the more immediately productive type of clearing work. However, in the light of the findings of the follow-up survey, it now appears unlikely that all this clearing will be carried out. As Table XI shows, the clearing planned for 1955 was less than a third of that planned for the three years, 1955-57, so that to implement the latter plans, the rate of clearing would have to be stepped up in 1956 and 1957. But the follow-up survey showed that *less* clearing was planned for 1956 than was planned for 1955. (On the other hand, the amount of clearing carried out in 1955 slightly exceeded the amount planned.)

TABLE XI

Land Worth Further Clearing, and Clearing Planned for 1955, and 1955-57

Type of Land	Worth Treatment		Clearing Planned	
	Area	Proportion of Total Area	For 1955	For 1955-57
Uncleared Land	Acres 22,140	Per cent 8	Acres 1,490	Acres 6,410
Land Already Partly Cleared ...	37,940	14	4,040	14,640
Total	60,080	22	5,530	21,050

Subdivision

Survey graziers attached almost the same importance to subdivision as they did to clearing as a method of property improvement. District agronomists, too, in their reports on the survey holdings stressed the need for further subdivision.

Subdivision should go hand in hand with pasture improvement. The reason for this may be stated in broad terms. If pasture improvement, say, doubles carrying capacity, then the optimum paddock size under natural grazing conditions should be halved to provide optimum management conditions under the new circumstances. This rough principle must of course be adjusted to allow for such factors as disease control and soil conservation programmes.

TABLE XII
Degree of Subdivision

Shire	Percentage of Paddocks in each Size Range				
	Less than 10 Acres	10 to 50 Acres	51 to 100 Acres	101 to 500 Acres	Greater than 500 Acres
	Per cent	Per cent	Per cent	Per cent	Per cent
Tumbarumba ...	4	44	22	29	1
Holbrook ...	2	22	24	49	3
Kyeamba ...	2	28	20	42	8
Tumut ...	14	29	20	33	4
Gundagai ...	14	38	18	29	1
Survey Area...	7	31	21	38	3

For each shire the percentage of all paddocks which fell in each of the size ranges, less than 10 acres, 10 to 50 acres, 51 to 100 acres, 101 to 500 acres and greater than 500 acres are given in Table XII. In the area as a whole, about 40 per cent of the paddocks were larger than 100 acres. The proportion of land in paddocks of this size was, of course, much higher. (A rough calculation based on the probably conservative assumptions that the average size of paddocks in the five classes used in Table XII are 8, 30, 75, 200 and 600 acres, respectively, shows that at least 80 per cent of the land was in paddocks larger than 100 acres).

Table XII suggests that holdings in Tumbarumba and Gundagai Shires have been subdivided most (30 per cent of paddocks greater than 100 acres) and Kyeamba and Holbrook Shires subdivided least (50 per cent of paddocks greater than 100 acres). Tumbarumba Shire would be expected to lead in degree of subdivision, since it leads in degree of pasture improvement. A large number of soldier settlers were interviewed in Kyeamba and Holbrook Shires, and this may account for the low degree of subdivision in these shires: most soldier settlers' blocks were initially very poorly subdivided, and the settlers have to some extent been limited by lack of finance. The high degree of subdivision shown for Gundagai Shire is rather surprising, since it was lowest in degree of pasture improvement.

Graziers' plans for erecting new subdivisional fencing, if carried out, would have brought about a 13 per cent increase in the amount of fencing in 1955, and would result in a 32 per cent increase by the end of 1957. However, the follow-up survey showed that only approximately two-thirds of the fencing planned for 1955 had actually been carried out by early 1956, and that only two-thirds as much new fencing was planned for 1956 as had been planned for 1955. This suggests that unless further revision of intentions are made, no more than a 20 per cent increase in subdivisional fencing is likely to occur by 1957.

Buildings

Information concerning buildings and other fixed improvements found on the survey properties is given in Figure 1. A high proportion of the properties had sheep yards, shearing sheds, machinery sheds and garages. Special accommodation for employees (in the form of either shearers' quarters or a cottage) was provided on 41 per cent of the holdings.

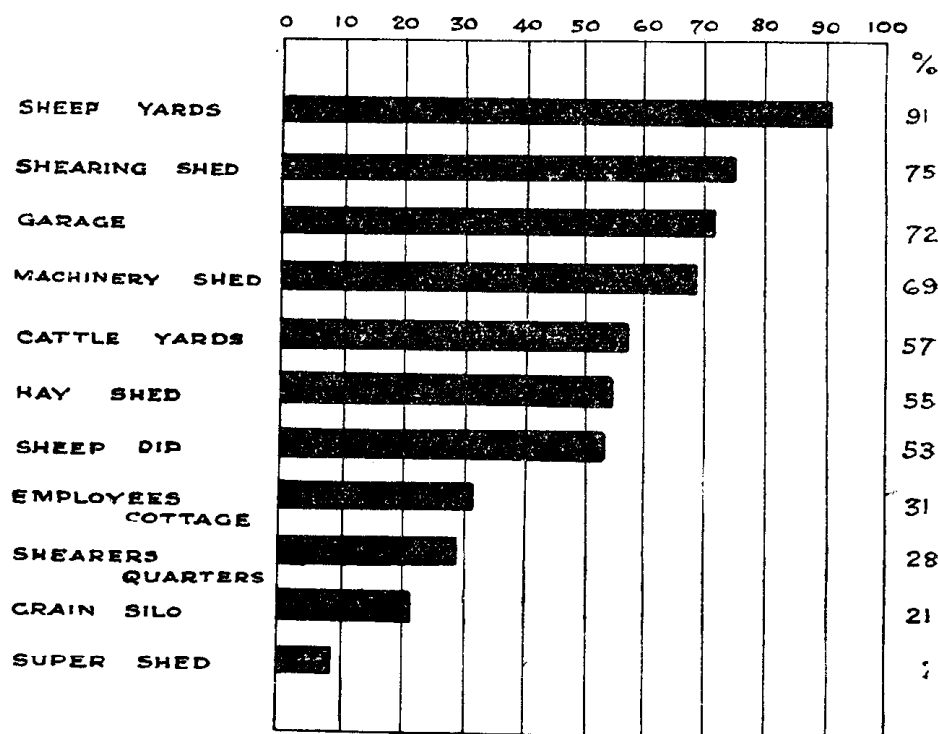


Fig. 1.—Percentage of Survey properties possessing various types of Buildings and Structures.

Rather than noting the number of properties which possessed each item, it is perhaps more useful to consider the number of properties which *lacked* certain improvements. Of the more essential types of building, the one most commonly lacking was a hay shed; there was no hay shed on almost half (45 per cent) of the properties. A similar proportion did not have their own sheep dip or shower, but since dipping is commonly carried out at a neighbour's or a community dip,

this deficiency does not betoken the same lack of interest in the practice of dipping as does the lack of a hay shed in fodder conservation. However, the movement of sheep between properties for the purpose of dipping may be a potent cause of the spread of disease.

Of the five important items—a shearing shed, a hay shed, a machinery shed, a sheep dip, a set of sheep yards—

- 2 per cent of the survey properties lacked all five;
- 9 per cent lacked four or more;
- 24 per cent lacked three or more;
- 48 per cent lacked two or more;
- 75 per cent lacked one or more; while
- 25 per cent possessed all five.

New Buildings Planned

As is shown in Table XIII landholders planned to erect a substantial number of new buildings in the three years, 1955-57. Sixty per cent of the graziers intended (or at least hoped) to erect some new buildings in the period.

Graziers in the survey area recognised the deficiency of hay sheds pointed out above, and planned to increase the number of these by somewhere near 50 per cent. If they all are able to put their plans into effect, only 30 per cent will lack a hay shed by the end of 1957, as compared with 45 per cent in 1954. A substantial increase in the number of grain silos is also likely to occur.

TABLE XIII

New Buildings or Substantial Additions to Old Buildings Planned for 1955, and 1955-57

Building	Planned to Erect Within—		Number of Properties Possessing Each Item, 1954-55	Planned Additions as a Percentage of Number Possessing Each Item†
	One Year (1955)	Three Years* (1955-57)		
	Number of Properties	Number of Properties	Number of Properties	Per cent
Hay Shed	17	40	83	50
Shearing Shed	12	23	113	20
Machinery Shed	9	16	104	15
Grain Silo	3	13	32	41
Employees' Cottage	4	12	47	25
Shearers' Quarters	5	7	42	17
Other Shed	2	8	50	16
Dwelling	4	7	150	5
Garage	3	6	108	6
Fertiliser Shed	1	5	10	50

* Includes those listed in previous column.

† This column does not represent the percentage increase in the number of buildings, since some of the planned new buildings will replace older buildings.

The great importance which graziers attach to a shearing shed is shown by the fact that all but 15 per cent hoped to have their own sheds by the end of 1957. Appreciable increases are also likely to occur in the amount of housing available for employees.

Altogether 60 new buildings were planned for erection during 1955. In the follow-up survey it was possible to check on whether 40 of these planned buildings were in fact erected. It was found that there had been a close correspondence between plans and performance. Thirty-five buildings were put up, which represents almost a 90 per cent fulfilment of plans. However, when individual types of buildings are considered, as in Table XIV, there are some minor discrepancies, so that the 90 per cent fulfilment represents the net achievement, brought about by over-fulfilment in respect of some types, and under-fulfilment in others. The major discrepancy is in respect of shearing sheds, of which nine were planned, but only five built.

TABLE XIV
Fulfilment of Plans for New Buildings

Type of Building	Planned to Be Erected during 1955	Actually Erected by February 1956
	No. of Buildings	No. of Buildings
Hay Shed	12	13
Shearing Shed	9	5
Other Shed	9	7
Shearers' Quarters	4	3
Employees' Cottage	3	4
Dwelling	3	3
Total	40	35

Machinery

A list of the machinery and equipment found on the survey properties is given in Table XV. Of more interest are the following figures relating to number of graziers who lacked important types of machines :—

- 15 per cent lacked a truck or utility,
- 19 per cent lacked superphosphate spreading equipment, i.e., a spinner- or blower-type broadcaster or any sort of direct-drop machine),
- 20 per cent had no tractor.
- 21 per cent had no shearing plant,
- 28 per cent had no hay cutting equipment (i.e., a mower or a binder), and
- 69 per cent had no hay baler (pick-up or stationary type).

From the foregoing it would appear that graziers regarded a truck or utility as the most essential of the items mentioned, since fewest lacked one. However, this result is brought about in part by the fact that among the lower-income graziers a utility tends to take the place of a car. In such cases the utility should be regarded as a vehicle for personal use rather than an item of farm plant. Nevertheless, the fact is noteworthy that two-thirds of those interviewed possessed a truck or utility *in addition* to a car. Although 19 per cent did not have any superphosphate spreading equipment, only 4 per cent have not done any topdressing. The remainder presumably borrowed the plant or had contractors do their topdressing.

Quite a large proportion (28 per cent) apparently did not have any haymaking equipment at all. Only a minority possessed hay balers, but, as will be seen when graziers' plans are discussed, a large increase in the use of pick-up balers can be anticipated.

TABLE XV

Machinery Usage in the Survey Area
Percentage of Properties Possessing each Item at Time of the Survey

Item	Percentage of Properties	Item	Percentage of Properties
	Per cent		Per cent
Car	70	Bale Loader	4
Truck	55	Header	27
Utility	52	Disc Plough	29
No Vehicle	2	Twin-Disc Plough	18
Tractor	79	Mouldboard Plough	57
Shearing Plant	74	Scarifier	27
Crutching Plant only	3	Disc Harrows	29
Superphosphate Distributor—		Rotary Hoe	5
Spinner	62	"Sun-prong"	4
Blower	1	Sod Seeder	2
Combine, Drill, Disc Drill, or Direct Drop Superphosphate Distributor	44	Chisel Plough	2
Mower	69	Fire-Fighting Plant	41
Binder	23	Power Saw	37
Pick-up Baler	15	Post-hole Digger	6
Stationary Baler	15	Post Borer	5
		Welding Plant	5
		Electric Fence	9

The figures quoted so far give no indication of how the various types of plant were distributed among the survey properties. Some idea is given by the following. Of the six important items—a shearing (or crutching) plant, a tractor, a truck or utility, a superphosphate spreading machine, a mower or grinder, a hay-baler—

1 per cent of the survey graziers lacked all six;

6 per cent lacked five or more;

12 per cent lacked four or more;
 25 per cent lacked three or more;
 48 per cent lacked two or more;
 78 per cent lacked one or more (in most cases a baler);
 and
 22 per cent owned all six.

Some caution is needed in accepting the figures quoted above. When a list of machinery is being obtained from a farmer, he is likely to overlook some items (particularly small items) but is hardly likely to mention machines that he does not possess. Thus all errors are likely to be in the one direction, and overall results may under-estimate the proportion possessing certain machines. The large proportion mentioned above as having no mower or binder, for instance, may exaggerate this deficiency.

Planned Machinery Purchases

As was the case with other improvements, graziers were questioned regarding their plans for purchasing additional plant. However, the follow-up survey showed that the plans for the 12-month period greatly understated the actual purchases made. The comparison between the actual and planned purchases of the 75 graziers from whom the information was obtained is made in Table XVI. In the case of all types of machinery, except shearing plants, actual purchases equalled or exceeded planned purchases. (The under-fulfilment of plans in respect of shearing plants reflects the under-fulfilment of plans for shearing sheds.) Twice as many machines were bought as were mentioned in plans, and the value of purchases was approximately double the value of planned purchases.

TABLE XVI
Fulfilment of Plans for New Machinery
 (75 Graziers)

Type of Machine	Planned to be Purchased during 1955	Actually Purchased by Early 1956
	No. of Machines	No. of Machines
Tractor	7	17
Pick-up Baler	4	4
Stationary Baler	1	1
All-crop Header	1	3
Shearing Plant	6 (17 stands)	3 (6 stands)
Land Rover	1	3
Truck ... ..	...	2
Superphosphate Distributor	2	4
Twin Disc Plough	1	5
Chisel Plough	3	3
Sod Seeder	1	2
Mower	1	5
Power Saw ... ..	...	4
Other Items	11	21
Total	39	77

Two likely explanations of this result come to mind. Firstly, there is probably a tendency on the part of respondents to overlook some of their plans, particularly those relating to small items. Secondly, "impulse-buying" probably accounts for a much higher proportion of machinery purchases than it does for purchases of other items.

The figures show quite a substantial rate of investment in machinery during 1955. However, Gruen's figures show that planned purchases in 1956 were, in value terms, only half those planned in 1954, which suggests a heavy curtailment in this type of investment.

Fodder Conservation

In the main fodder was conserved on the farms where it was fed. It was not possible to obtain satisfactory details of the use of this fodder in relation to the sheep enterprise.

Supplementary feeding of cattle has been discussed in the first report of this survey.* In general fodder, where conserved, was kept as a drought reserve with some being distributed seasonally. Some consideration will be given here to the amount of fodder conserved, the number of graziers conserving at the time of the survey and to planned changes in the number of operators conserving and the quantity conserved.

Table XVII shows the amount of each type of fodder conserved per 100 dry sheep equivalents on the average farm in the area. Also given is the proportion of farmers who conserved the different types of fodder. As would be expected hay is much more popular than grain or silage. The generally low amount of feed stored per dry sheep equivalent is surprising.

TABLE XVII
Fodder Conservation in the Survey Area

Aspect of Fodder Conservation	Type of Fodder			
	Hay	Grain	Silage	Total
Average Quantity per 100 Sheep Equivalents	Tons 1.78 Per cent	Bush. 14.0 Per cent	Tons 0.10 Per cent	n.a. Per cent
Proportion of Farmers who Conserved	65	23	3	69
Proportion of Farmers who Considered their Supply Inadequate	41	5	3	45

n.a.: Not applicable.

The graziers were also asked if they considered their stock of conserved fodder, at the beginning of Winter, 1954, to be adequate. Sixty-seven (45 per cent) of the 150 graziers interviewed said that they should have more, preference being first for hay with grain and silage

* Parish and Dillon, *op. cit.* p. 82.

following in that order. Of course these opinions may be conditioned by the fact that the graziers in the region have had the benefit of above average seasons in recent years and consequently (a) may think that a drought will occur soon or (b) may have forgotten how severe a drought can be.

Of these 67 who regarded their supply as inadequate, 16 (one-quarter) had no fodder conserved at the time of the survey.

It is estimated that if the graziers did conserve what they considered an adequate supply of fodder, then stocks at the time of the survey on an average farm would be increased as follows: hay, 120 per cent; grain, 30 per cent; silage, 300 per cent. The large increase in the amount of silage would be due to the fulfilling of plans on three properties where (in comparison with present usage) a rather large ensilage programme was planned.

Whilst at the time of the investigation 69 per cent of survey operators conserved fodder, it is estimated that by 1958 between 80 and 85 per cent would have some fodder conserved. This estimate is based on graziers' plans for purchasing hay-making equipment and for erecting hay sheds and grain silos, as well as on direct statements of the intention to begin a fodder conservation programme.