WINTER FEEDING FOR INCREASED FAT LAMB PRODUCTION IN THE CENTRAL AND NORTHERN TABLELANDS OF NEW SOUTH WALES*

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1. SUMMARY

In this article actual feeding levels reported by farmers in the Oberon area have been used to assess the results, in physical terms, that can be achieved by regular feeding. These results are compared with current findings from feeding trials. On the basis thus established, valuations of various types of supplementary feed are made.

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The valuations are used to assess the profitability of feeding and to explain differences in feeding practice. The influence of lamb returns, lambing percentages, and the time taken to market lambs is examined. It is suggested that the incidence of spring drought in the Northern Tablelands is a major restraint on regular feeding.

2. INTRODUCTION

In the Oberon district (Central Tablelands) fat lamb producers regard regular winter feeding as essential or very desirable. Almost all of fifteen farmers interviewed supplement pasture with stored fodder regularly. Therefore it was a surprise to find during interviews with a number of New England fat lamb producers that they have little interest in regular feeding and tend to conserve fodder only to meet irregular shortages.

Supplementary feeding in winter is often regarded simply as a means of preventing lambing sickness. However, to make a full economic assessment of feeding one must consider what additional output can be achieved. This depends upon the level of feeding because marginal returns to increased supplements will diminish as more of the annual requirements are met in this way. The following discussion relates only to the returns from feeding to increase stocking by about half a sheep per acre. The possibility of utilizing all of the pasture produced in the warm months has not been explored.[1]

If the physical possibilities for raising lamb production by winter feeding can be assessed, then it becomes possible to come to some conclusions on two questions. How profitable is this method of raising output; and what are the reasons for apparent differences in profitability between districts?

3. MEASUREMENT AND VALUATION OF THE FEED REQUIRED

Information on the results from feeding comes either from material gathered from farmers or from experiments. The former source has been used in this study, and experimental results have been used to corroborate the conclusions reached.

Characteristics of the Farms Providing Data

In a study of fifteen fat lamb producers in the Oberon district in 1962, farmers were asked about winter feeding practices. Most could only give figures for the amount of fodder normally held, but five were able to give fairly accurate figures on the amount of feed used each winter. Table 1 lists selected characteristics of the fifteen survey farms and the subgroup of five. The feeding levels and results achieved are related to the characteristics of the farms studied. However, these farms and the district in which they are situated do not appear to have such marked peculiarities that the results achieved, in physical terms, could not be matched elsewhere on the Tablelands.

[1] Cf. A. G. Lloyd, "Fodder Conservation in the Southern Tablelands Wool Industry", this *Review*, Vol. 27, No. 1 (March, 1959).

TABLE 1

Details of a Group of Fat Lamb Farms in the Oberon District

Characteristic	Reporting Amounts Fed (5)	Remainder (10)	Whole Group (15)
Average Area (Acres)	537	783	701
Proportion under Sown Pasture	82%	73%	75%
Average Super Application per Sown Acre, 1961-62 (cwt.)	1.24	1.12	1.16
Crossbred Ewes (Average)	835	1,010	951
Largest Crossbred Ewe Flock	1,500	2,000	2,000
Overall Percentage of Lambs Marked 1961	103%	96%	98%
Merino Sheep* Mainly Wethers (average)	100	103	102
Adult Cattle (Average)	22	41	35
Overall Stocking Rate (Cross-bred Ewe Equivalents) †	1.76‡	1.68	1.70
Stocking Rate per Acre Sown Pasture (Cross-bred Ewe Equivalent)	2.15	2.31	2.27
Grazing Oats (Acres—Average)	36	29	31
Swede Turnips for Grazing (Acres—Average)	6	11	9

* Some merinos are kept for only part of the year.

† Cattle have been converted to ewe equivalents at the rate of 5 for 1.

‡ This is a weighted average and not the simple average of the stocking rates shown in Table 2.

Feeding Levels and Increases in Stocking on Five Farms

Table 2 shows the amounts fed (estimated as Total Digestible Nutrients) by the farmers in the Oberon district who were able to give full information. It shows the range of combinations of pasture hay, oaten hay, lucerne hay, and oat grain that are used.

These farmers also gave estimates of how many sheep could be carried without feeding. These are based on previous experience, before winter feeding was adopted, and are therefore assumed to be reliable. Estimates, consistent with these five, were made by most of the other farmers interviewed. From these figures the calculations, in Table 2, of the feed requirement of an additional ewe have been made.

The calculations of Starch Equivalent (S.E.) are included so that comparisons can be made with the published results of experimental work using these units.[2] Lloyd, following Briggs, Franklin and McClymont, used the figures of 5.5 S.E. per week as the maintenance requirement of a merino ewe.[3] The figures for pregnant crossbreds derived in Table 2 (16.6 ; 12.5 ; 12.4 ; 11.5 ; 13.7) are more than double this. Allowances for waste in feeding and for the greater requirements of pregnant crossbred

[2] The calculations of weekly requirement depend on stated feeding periods which were given as whole months.

[3] A. G. Lloyd, *op. cit.*, p. 26.

ewes account for most of the difference. Also the recent results of Lambourne and Reardon demonstrate that a further allowance should be made for the greater intake of a sheep allowed to graze freely instead of being held in a pen.[4]

TABLE 2

Supplementary Feed Required for an Additional Ewe on Five Oberon Farms

	A	B	C	D	E
Crossbred Ewe Equivalents per Acre*	2.0	1.7	1.6	0.9	2.2
Estimated Stocking Rate without Supplements	1.5	1.3	1.1	0.6	1.7
Apparent Increase per Acre	0.5	0.4	0.5	0.3	0.5
Hand Feeding (Total Digestible Nutrients)†—	lb.	lb.	lb.	lb.	lb.
Pasture Hay	14,100	24,000	8,500	..	56,400
Oaten Hay	..	..	5,600	..	..
Oat Grain	8,400	31,000	8,400	..	8,600
Lucerne Hay (purchased)	..	..	3,500	10,500	..
Total Hand Feeding	22,500	55,000	26,000	10,500	65,000
Additional Ewes (Number Carried less Estimated Number without Feeding)	240	290	200	130	430
Hand Feeding per Additional Ewe	94	190	130	81	151
Supplementary Grazing—		(lb. T.D.N.)			
Oats (800 lb. T.D.N./acre)‡	48,000	16,000	32,000	16,000	32,000
Swede Turnips (1,500 lb. T.D.N./acre)§	..	15,000	..	..	7,500
Total Supplementary Grazing	48,000	31,000	32,000	16,000	39,500
Supplementary Grazing per Additional Ewe	200	107	160	123	92
		(lb. T.D.N.)			
Total Supplementary Feed per Additional Ewe	294	297	290	204	243
Extent of all Feeding (Months)	3	4	4	3	3
T.D.N. (per Additional Ewe per Month) all Sources	98	74	73	68	81
Apparent Feed Requirement—Starch Equivalent—lb. per week¶	16.6	12.5	12.4	11.5	13.7

* Farms B, C, D, still have considerable areas not cleared. This accounts for the low stocking rate.

† The percentages of TDN are taken from Morrison—*Feeds and Feeding.*

‡ This estimate is based mainly on the results of P. M. Guerin at New England Agricultural Research Station, Glen Innes. A severe grazing system was used in order to indicate the results which could be expected under farm conditions.

§ Swedes are assumed to yield 14 tons/acre, of which one third may be wasted. Thus, 1500 lb. of digestible nutrients would be available per acre.

¶ It is assumed that 1 lb. TDN is equivalent to ¾ lb. S.E.

[4] L. J. Lambourne, and T. F. Reardon, "Effect of Environment on the Maintenance Requirement of Merino Wethers", *Australian Journal of Agricultural Research*, Vol. 14, No. 2, (March, 1963).

Valuing the Feeds

When an additional ewe is run, as a result of feeding, a partial budget can be constructed, as in Table 3, to find the additional net return. Typically, handling facilities (yards, shearing, plant, etc.) and the existing supply of farm labour are adequate to handle considerably more sheep than are at present depastured on such properties. If investment to increase capacity were necessary in a particular case then the annual cost of the investment would have to be incorporated in the budget. Similarly the cost of additional labour might have to be allowed for.

The calculated net return may be regarded as a return to the feed used, so that the value per unit is obtained by dividing the amount fed into the net return (see Table 4). The resulting valuations depend upon the assumption that the additional pasture consumed during the rest of the year, when feeding is not required, has no opportunity cost.

In Table 2 the three highest levels of apparent feed use (297, 294, 290) are close to 300 lb. TDN per annum for an additional ewe. This figure has been used in compiling Table 4. Should an additional ewe only require 200 lb. TDN[5], instead of 300, then the "break even" values of the feeds would be 1½ times those shown in the body of Table 4.

To use this table in practice the farmer would want to incorporate a normal profit into his budget. For instance, if a 10s. profit per additional ewe were sought then the net return in the budget shown in Table 3 would become 70s. To make his 10s. profit the farmer could then afford to pay no more than the prices shown in the 70s. column of Table 4 (Oats 6s. 6d. bus., lucerne £13 a ton; and so on).

TABLE 3

Example of Budgeted Returns from an Additional Ewe

	s. d.	s. d.
Receipts—		
Wool: 9 lb. at 4s. 0d. net		36 0
1 Fat Lamb Sold at 70s. 0d. net (after Marketing Costs)		70 0
Total Receipts		106 0
Expenses—		
Interest on Capital Invested in Ewe (£2 10s. 0d. at 6 per cent.)	3 0	
Shearing, Drenching, Crutching, Dipping, Inoculating	12 0	
Replacement Cost (Annual Basis—including Deaths)	9 0	
Additional Ram Replacements—Annual Basis	2 0	
Total Expenses		26 0
Net Return (from which Cost of Feeding Must Be Met)		80 0

[5] Two of the farmers had feed use levels at about this figure (see Table 2).

TABLE 4

"Break-Even" Values of Feeds Used to Increase Stocking—at 300 lb. T.D.N. per Additional Ewe

("Break-Even" values per unit shown in body of table)

Type of Supplement	Unit	Net Return from an Additional Ewe											
		90s.			80s.			70s.			60s.			50s.			40s.		
		£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Oat Grain	Bushel	0	8	5	0	7	6	0	6	6	0	5	7	0	4	8	0	3	8
Lucerne Hay ..	Ton	17	0	0	15	0	0	13	0	0	11	0	0	9	10	0	7	10	0
Pasture Hay ..	Ton	15	0	0	13	10	0	11	10	0	10	0	0	8	10	0	6	10	0
Grazing Oats ..	Acre	12	0	0	10	10	0	9	10	0	8	0	0	6	10	0	5	10	0
Swede Turnips (Grazing).. ..	Acre	22	10	0	20	0	0	17	10	0	15	0	0	12	10	0	10	0	0

4. FACTORS AFFECTING PROFITS FROM FEEDING IN THE TWO AREAS

Table 4 provides a means of deciding whether feeding will pay or not, and can be expected to form the basis of an explanation of the differences between districts. Several factors influence profitability.

Differences in Type of Lamb and Lamb Returns

The budgeted net return (Table 3) is a major determinant of whether feeding pays and the price of a lamb is a main element in its calculation. Lambs from Oberon are sold in Sydney or in the paddock at prices based on those ruling in Sydney. Those from a large part of the Northern Tablelands are sold at Brisbane. Prices have been compared by interviewing farmers and by comparing newspaper and Meat Board quotations for Sydney and Brisbane markets.

Unweighted averages of the monthly quotations for January to May inclusive, the months in which most Tablelands lambs are sold, suggest that Brisbane prices per pound for the higher grades exceeded Sydney prices by 18 per cent in 1959, by 6 per cent in 1960, and by 15 per cent in 1962, and that Sydney prices exceeded Brisbane prices by 2 per cent in 1961.[6]

In 1962 the weighted average of prices received at Homebush by the Oberon farmers studied was 78s. 6d.[7] Assuming that a lamb, in that year, had a skin value of 16s., the average carcase value of Oberon lambs was about 62s. 6d. The hypothetical carcase value of the same type and weight of lamb on the Brisbane market would be 15 per cent more, judging by the quotations for 1962, making 72s. without, and 88s. with the skin. Any substantial departure from this hypothetical figure would suggest that New England lambs sold in Brisbane differ in average weight, quality, or type, from the Oberon lambs sold in Sydney.

[6] *The Meat Producer and Exporter* (Journal of the Australian Meat Board), Vol. 17, No. 1 (Jan., 1963), p. 16, "Market Price Trends, Lamb 29-36 lb. 1st and 2nd Export Quality". In both centres prices were better in the previous three years than in 1962.

[7] Paddock sales have been converted to equivalent Homebush prices by adding 5s. per head.

In fact, 88s. is higher than the average level of actual prices reported in the *Queensland Country Life,* over the period, and higher than those reported by farmers who have been interviewed. From reports of actual sales by New England producers over the selling season, the averages of prices received for good lambs in 1962 was about 81s.[8] It can be concluded that the longer trip to market and differences in the type of lamb generally produced reduce the apparent price advantage of lambs sold. This reduces the incentive to feed in New England.

In each case the prices are converted to a net return at farm by subtracting marketing costs of 5s. per head, for Oberon lambs and 13s. for Northern New England lambs.[9] Thus market prices of 78s. 6d. and 81s. give net returns of 73s. 6d. and 68s. respectively.

At the assumed wool return and costs budgeted in Table 3, and with a return per lamb of 73s. 6d. the net return from an additional ewe was 83s. 6d. at Oberon. If a profit of 13s. 6d. were to be made from her, 6s. 6d. a bushel could be paid for oats, £13 a ton for lucerne and so on.[10] Similarly one would expect that, at these feed prices, New England farmers could clear 8s. from every additional ewe run as a result of feeding. This result indicates that although, on the assumptions of the budget (Table 3), feeding would pay in both areas, the added return does not provide as great an incentive in the Northern Tablelands as in the Oberon district.

Lambing Percentages and Length of Time Before Marketing

The lambing percentage for the Oberon group is about 100 per cent (lambs marked), and has been increasing gradually. The range is from 80 per cent to 118 per cent, depending to a large extent upon the proportion of maiden ewes in the flock. In the New England area similar lambing percentages seem to be achieved with crossbred ewes.[11] However, less than half of the fat lambs from New England are produced from this type of ewe, and a majority are at present being produced from merino ewes which can only be expected to give an 80 per cent lambing or less, on the average.[12] A lamb of this type brings about as much as one bred from a crossbred ewe because of the greater skin value and the practice

[8] A simple average of individual sellers' quotations, reported in the *Queensland Country Life* newspaper.

[9] The New England figure was calculated for Guyra. Freight from Glen Innes is only slightly less. The figure is made up for an 80s. lamb as follows; freight 10s., commission 2s. 10d. (3½ per cent), yard charges 4d. Total 13s. 2d. In the 1963 season freight (by road) from Guyra has been reduced to 9s. Selling commission in Sydney is only 2½ per cent.

[10] Table 4, third column.

[11] The writer has found few cases of more than 100 per cent lambing in New England, but James is inclined to think that higher lambing rates prevail. cf. B. J. F. James, "The Comparative Profitability or Fat Lamb Raising and Wool Production in the Glen Innes District", this *Review,* vol. 30, No. 2 (June, 1962).

[12] Estimates of numbers of fat lambs produced have been based on figures on intended matings collected by the Bureau of Census and Statistics.

of selling at a greater weight.[13] Thus we could assume a price of 81s., with a net return of 68s., but if each ewe produces, on the average, 0.8 of a lamb, the lamb return per ewe will be 54s. 5d. This reduction in lamb return of 13s. 7d. per ewe might be made up by the higher wool return.

These calculations seem to suggest that the merino ewe could be almost as good a proposition for fat lambs as the crossbred. However, the weakness lies in the need to keep lambs longer in order to sell them at prices equal to those brought by other lambs. Some lambs are not sold until June and by this time they have encroached on the feed supplies required for the next season's production. This disadvantage of the system would become much more pronounced if an attempt were made to raise production by feeding. Hence it is concluded that feeding for greater output is least profitable in that large part of the New England fat lamb industry which at present uses merino ewes.

Fodder Costs

In the light of the valuations made in Table 4, and after the net return from an additional ewe has been properly budgeted (as in Table 3), it becomes possible to decide whether or not a feed costs too much to use.

The cost of pasture hay varies considerably. Lloyd estimated that its cost ranged from £5 6s. per ton for 200 tons, to £7 17s. per ton for 50 tons harvested, stored and fed out annually in the Yass Valley.[14] On the Tablelands fat lamb producers seldom harvest much more than 50 tons. Included in the figure of £7 17s. per ton (for 50 tons) is an amount of 10s. for feeding out and 22s. for a 15 per cent wastage in storage and feeding out. The former is presumed to be a labour cost. In the Oberon area this additional task is handled without trouble by the permanent labour force (usually the farmer himself), as it fits in with the general care of stock. The figure for wastage is too high for this discussion as the average storage period is only 7 or 8 months, and the whole study is based on figures for what is fed out, regardless of what is wasted after that. For these reasons the feeding out charge can justifiably be dropped and the wastage charge reduced by about two-thirds. These changes would reduce the cost to about £6 12s. per ton.

On the other hand rain in summer may be expected to cause greater losses during haymaking in the Tablelands. If half of the material which is cut and raked is then spoilt, the variable costs (using Lloyd's figures) are increased by about 15s. per ton, assuming that 50 tons of hay are finally made.[15] However, Tablelands farmers often get into the shed as little as 35 tons of hay. On the assumptions so far made, this hay would cost about £8 10s. per ton.

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[13] Reported by farmers engaged in this type of production. See James, *op. cit.*, p. 96, for a discussion of this practice.

[14] A. G. Lloyd, *op. cit.*, pp. 16, 17.

[15] *Ibid.*, p. 17, Tables 2 and 3. Man-hours per ton for mowing and raking (at 7s. 6d. per man-hour) are increased by 0.9; tractor hours (at 11s.) correspondingly increase by 0.75. Labour cost is included in this calculation because it is assumed that additional men are hired for the task.

By referring to Table 4, it can be seen that pasture hay costing £8 10s. per ton would make it possible to "break even" at a net return per additional ewe of 50s. Thus haymaking appears to be a good proposition in all Tablelands areas. However there is a chance that, in a wet season, no hay can be made. This would not only be costly because of idle plant, but might also leave the farmer with insufficient feed for the greater number of sheep now carried.

Lucerne hay at £9 10s. per ton (Table 4, 50s. net return) is equivalent in energy value to pasture hay costing £8 10s., but is bought by a number of Oberon farmers for between £10 and £12 per ton as an alternative to buying haymaking plant. In this way a reliable supply of fodder is obtained without heavy investment.

Oat grain, at the prices which normally prevail, is a rather more costly feed than hay, but is convenient to handle and store. In the case of oats produced on the farm, it is often a joint product with winter green feed (grazing), so that its cost to the farmer may be low.

This brief examination of fodder costs has not suggested any differences between regions sufficiently large to cause a difference in feeding practice. Other causes of the observed difference must therefore be sought.

5. OTHER INFLUENCES ON FEEDING PRACTICE

The full extent of regional differences is not brought out by the foregoing financial assessment, and the following factors are to be considered.

Stocking Levels

A number of observers have suggested that a large part of the improved pasture in the Northern Tablelands is too lightly stocked for economic operation, so that even the restricted supply of winter pasture is adequate for the stock carried. This is not true in all cases and a limited number of fat lamb producers run about 2 crossbred ewes per acre with little or no supplementary feeding. These farmers have probably reached their safe production limit under the existing system, and it is only in this situation that feeding for greater output need be considered.

Climate and Length of Feeding Period

Although it has been shown that regular feeding is less profitable in New England it has not been shown to be unprofitable, at the assumed requirement of 300 lb. T.D.N. per annum for an additional ewe. This assumption may not be as adequate under the climatic conditions of the New England Tablelands, as they are for the Oberon district. In the latter area there is enough rainfall in winter to build up a high level of soil water, so that rapid pasture growth is assured when the warm spring weather begins. This means that the farmer who feeds in winter can be confident that the need for feeding will cease at virtually the same time each year. As a result there is little need to hold a large contingency reserve and the farmer is able to turn over most of his stored fodder each year.

In contrast, the New England area has less rain in winter than in other seasons, so that there is little accumulation of soil water, with the result that spring pasture growth is dependent upon timely rain in that season. About

one year in three rain is short so that there is a spring drought. To complicate the picture there is an even greater likelihood of an autumn feed shortage in the following spring. This now becomes an inventory problem, as increased stocking will involve the farmer in larger contingency reserves of fodder which will only be required, on the average, once in three years.[16]

The New England situation is reflected in farmers' estimates reported by Lloyd, of how long they would have to hand feed an addition to their flocks of 25 per cent.[17] The average period given was 5.2 months, and two farmers even included October in the period of feed shortage. Obviously they were trying to allow for the spring drought. For comparison, 6 farmers in the Central Tablelands reported feed shortage periods averaging 3.6 months.[18] The New England estimates should be treated with caution as farmers in that area have less experience of feeding.

Although this is essentially an inventory problem, it may be sufficient for the present purpose to strike an average feeding period for the New England area, thus allowing for shortages in spring while overlooking the added costs of keeping a large reserve to meet variable requirements.

The feeding period reported by the three Oberon farmers who gave a high level of feed requirement for an additional ewe (290 to 297 lb. T.D.N.) averaged 3.7 months. If, in the Northern Tablelands, this period is lengthened by two months, for one year in every three, the average feeding period becomes 4.4 months and a proportional increase would raise the feed requirement to approximately 360 lb. T.D.N.

At this point the conclusions drawn so far can be incorporated into an assessment of feeding in New England. On page 67 it was concluded that 68s. was the average return per lamb on the farm in 1962. For simplicity this can be taken to be approximately 70s., giving, as in the budget in Table 3, a net return to an additional ewe of 80s. However, the "break even" prices in Table 4 have to be reduced to allow for the higher average feed requirement calculated above (360 instead of 300 lb. T.D.N.). The values in Table 3, for 80s. net return, become:—

	£	s.	d.
Oat grain (bus.)		6	2
Lucerne hay (ton)	12	10	0
Pasture hay (ton)	11	0	0
Grazing oats (acre)	9	0	0
Swede turnips (acre)	16	10	0

The value of the bought fodders are close to average purchase prices, in which case it follows that at a 70s. net return for a lamb, the cost of feeding an additional ewe is only just covered by the additional revenue. Previous discussion suggests that pasture hay can be made for less than the figure shown above so that this may be a profitable source of fodder for increased output. However the added costs of storage to meet occasional spring shortages must also be met.

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[16] This abbreviated account of the weather and growth pattern is drawn from information supplied by E. J. Hilder of the C.S.I.R.O. at Armidale.

[17] A. G. Lloyd, *op. cit.*, pp. 24, 25.

[18] *Ibid.*, p. 24.

The grazing crops can probably be produced for considerably less than the values calculated above and have been the most popular source of supplementary feed. Oats are suitable for meeting the occasional late feed shortages, in which event they can be fed off completely.

Thus it has been shown that the profits to be made from feeding are significantly reduced in the Northern Tablelands because of the longer average feeding period. The unpredictable duration of feed shortage in the latter area will tend to reduce the profits even more.[19]

6. ANOTHER APPROACH—NITROGEN FERTILIZERS

As their cost in relation to other inputs has been reduced in recent years, nitrogen fertilizers may well have become an economic and simple means of raising winter feed production. Trials are being carried on to determine yield responses in winter fodder crops and in grasses. Clear results from nitrogen applications to pasture are not yet available. Applications of 30 lb. of nitrogen per acre to grazing oats have increased dry matter yields by 500 lb. where the oats were sown on old clover land, and by 2,000 lb. on good basalt, not previously sown to pasture.[20]

Assuming that the crop of oats would be grown anyway, the approximate cost of obtaining this increase is £2 10s. for purchase and application of nitrogen fertilizer. The experimental yield increases should perhaps be discounted for farm conditions, but even so it would not be hard to increase yield enough to make this method of obtaining an added supplement less costly than bought fodder or even hay harvested on the property. To equal the cost of other fodders per unit of digestible nutrient the increases in dry matter yield in consequence of applying nitrogen fertilizer would have to be as follows:

Feed Compared and Assumed Price	*Required Increase in Utilizable Dry Matter from Grazing Oats after 30 lb. N applied, to give the same cost per lb. T.D.N.*
Oats at 7s. 6d. per bus.	280 lb. DM
Lucerne hay at £12 per ton	350
Pasture hay at £8 per ton	470

7. CONCLUSION

The empirical evidence collected in the Oberon district indicates that all the common feeds, at their prevailing costs, can profitably be used to increase the output of fat lambs in that area. This is consistent with the general opinion of farmers in the district that feeding is worthwhile.

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[19] This argument only relates to increased stocking as a result of feeding. It is not denied that fodder conservation, without increases in stock, will reduce the risk of pregnancy toxaemia, and any other losses due to periodic feed shortages.

[20] Memo on experiments in the New England area carried out by Australian Fertilisers Ltd.

Inferences can be made from this work to what can be achieved in another part of the Tablelands as long as significant local peculiarities are taken into account. In the Northern Tablelands, slightly lower lamb returns, the widespread use of merino ewes for fat lamb mothers, and some under-utilisation of improved pasture, are at present tending to reduce the potential profits from regular feeding. The fat lamb industry in the Northern Tablelands is at an early stage of development and it is to be expected that lambing percentages and returns will improve, and that sown pastures will be more fully utilized. Under these circumstances feeding to carry more ewes may become profitable, although the returns from this practice would still be less than they are in regions that have more dependable pasture growth in spring.

Where feeding for greater output is economic, it can be an attractive method of expansion, as the investment in fodder is for a short period only. Thus, farmers at Oberon have embarked on feeding programmes to raise output before completing the clearing of their properties.

Investment in haymaking plant competes with other investment, so that in the Oberon district bought fodder is often used as a winter feed. However, it has been demonstrated that, at its current cost, bought fodder in the Northern Tablelands cannot be considered as a regular supplement to pastures in fat lamb raising. On most Northern Tablelands properties investment in haymaking plant has a lower priority than investment in pasture improvement. Therefore substantial increases in winter feeding in that area will probably not occur until pasture improvement is well advanced.