PASTURE UTILISATION:

PROFITABLE PASTURE UTILISATION - SHEEP

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Abstract: The challenge for wool producers is to develop a management system which promotes profitable pasture utilisation. Stocking rate is a key issue in determining profitable pasture utilisation, and management decisions such as time of lambing, time of shearing, flock structure, animal health programs and supplementary feeding strategies will influence the number of sheep which can effectively be run on a grazing property. Genotype can also markedly influence profitability. The importance of all these factors in determining profitable pasture utilisation is discussed, and example farms examined.

INTRODUCTION

Profitable pasture utilisation from a sheep enterprise may be an anachronism in 1993. However, the principles of profitable pasture utilisation remain similar with low or high wool prices, and many would argue that it is even more important to adopt such principles at a time of low wool prices.

As a producer, you are faced with many challenges in the grazing system:

- establishing and maintaining productive pastures for your environment
- managing these pastures to benefit both animal production and pasture production

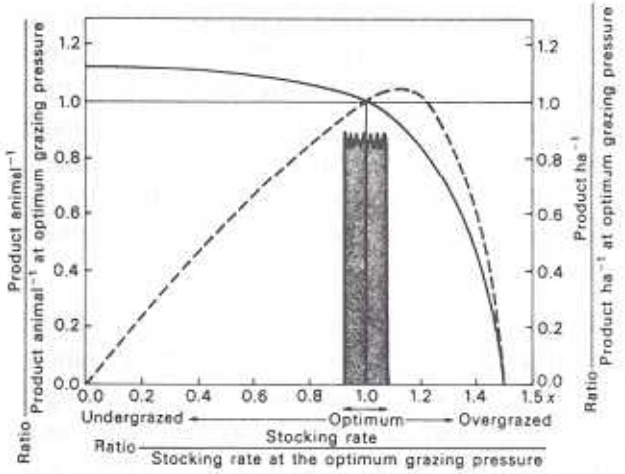

Figure 1: Relationship between stocking rate and production per animal (——) and per hectare (- - -) (after Jones and Sandland, 1974).

- managing the stock to effectively utilise the pastures
- marketing your products.

Any weakness in an enterprise at any of these levels will severely downgrade efforts made in the other areas.

In this paper I will focus on pasture utilisation in a wool producing flock, although many of the principles are similar in prime lamb flocks. This paper is not intended to be a review on pasture utilisation, but rather will outline management strategies which promote profitable pasture utilisation.

PASTURE UTILISATION AND STOCKING RATE

Stocking rate is recognised as the key to profitable pasture utilisation (White and Morley, 1977; Bell, 1988). The relationship between stocking rate, pasture utilisation and profit is complex. As stocking rate increases, pasture quality may improve, but as stocking rate further increases, pasture production declines (Dunlop *et al.*, 1984). Restrictions in feed intakes at higher stocking rates may increase efficiency of feed to wool (Williams, 1966), but at very high stocking rates, a decrease in ability to select feed on offer may decrease efficiency.

As stocking rates increase, wool cut per head decreases, but wool cut per hectare increases. Wool quality may decrease if the increase in stocking rate

results in severe feed restrictions, causing a decrease in staple strength; but fibre diameter will also decrease, which may increase wool value.

Despite these complex interactions, the optimum stocking rate (OSR) (the stocking rate which maximises profit, not production) can be determined for each property. Paddock to paddock variation in OSRs can be large, but the astute manager will be aware of much of the paddock to paddock variation on his property, and will therefore be able to stock paddocks accordingly. Wool prices, pasture production, management strategies, genotype and supplementary feed costs will all affect OSR. Profits will be relatively insensitive to changes in stocking rate near the OSR (White and Morley,1977).

A key advantage of being stocked at or near the OSR is the added benefits available through techniques which increase pasture productivity (*eg.* fertiliser application on responsive soils; pasture improvement programs *etc*). Growth of additional pasture will result in only minimal production benefits at low stocking rates, whereas at higher stocking rates opportunities will be greater from increasing pasture production and/or quality.

MANAGEMENT STRATEGIES

The management of a flock can have a large impact on pasture utilisation and the profitability of growing additional pasture. Stocking rate, time of lambing, time of shearing, flock structure, genotype, animal health programs and supplementary feeding are all tools available to the manager to optimise pasture utilisation.

Time of lambing

Matching pasture growth with animal requirements will increase the carrying capacity of a property, and decrease the need to transfer feed from one season to another. In southern Australia, lambing in late winter/early spring will increase the carrying capacity over the winter period.

The effect of time of lambing may be easily seen by looking at the feed requirements (for maintenance) of the lambing ewe, shown in Table 1.

A ewe with a lamb at foot is worth approximately 2.5 times a dry ewe, and 50% more than a late pregnant ewe. Feed intake of the ewe with a lamb at foot increases by 50-60%. The effect therefore of lambing down 1 000 ewes is to similar to taking on say 1 000 wethers on agistment (and stocking them for maintenance).

Table 1: Energy requirements of sheep.

Class	Energy requirement MJ ME/day
Dry ewe	6.5
Late Pregnant ewe	10.5
Ewe with single lamb at foot	16
Ewe with twins at foot	23
Wether (10% heavier than ewe)	7

Lambing at a time when feed is limiting (autumn/winter) will result in a lowering of the carrying capacity to cater for the higher requirements of the lambing ewes. This will result in lower utilisation of pasture in the spring, and will decrease the ability to recoup investment in fertilisers or pasture improvement.

Time of shearing

Feed requirements increase after shearing (30%-80%), and these increases are greatest in cold conditions. Feed intake also increases. Shearing in winter in Tasmania was estimated to decrease carrying capacity by 40% in dry sheep, and 16-27% in late winter lambing ewes (Black and Bottomley,1980). The message is simple - avoid shearing over winter.

Flock Structure

Flock structure can play an important role in the profitability of an enterprise. This is despite gross margin analyses consistently indicating little difference between different flock structures, except under more extreme price conditions (*eg.* high sheep prices, low wool prices). Such analyses do not allow for the increase in flexibility of the flock by retaining wethers to 4 or 5 years of age.

Wethers can be regarded as "low priority" stock, and can be run at higher stocking rates than lambing ewes or weaners. They will also decrease drought requirements, and can assist in worm control programs. The lower labour input means more effort and resources can be put into the "high priority" stock. The net effect is to allow a higher level of management at higher stocking rates.

Maintaining a high proportion of the flock as wethers will therefore allow stocking rate on the property to be increased, whilst decreasing some of the risks associated with increasing stocking rate. Additional returns from increasing stocking rate will mean a more profitable flock.

Genotype

Despite enormous interest in sheep breeding, there is only limited worthwhile information on the relative profitability of various strains (bloodlines) of Merino sheep. Differences in profitability from the least profitable strains to the most profitable are in the order of 100%, and the most profitable strains are in the order of 50% above the average (Wilson *et al.*,1986). Clearly, changes in wool prices, and other management considerations (suitability to environment etc) need to be taken into account when deciding on the genotype.

Even so, if differences in productivity are not a function of feed intake, then the genotype can have important implications on profitable pasture utilisation. Both increases in stocking rate and strategies aimed at increasing pasture production will have a greater impact on providing additional returns in more profitable sheep.

Animal Health

The implementation of sound animal health programs will be important in ensuring profitable pasture utilisation. Animal health problems will have both a direct and an indirect effect of pasture utilisation. Directly, diseased animals will generally be less productive, and the value of the wool will be downgraded. Indirectly, increased workloads associated with poor disease control, together with a reluctance to increase productivity in the face of such problems, will result in failure to implement more profitable strategies, such as increasing stocking rates or changing time of lambing.

The eradication of virulent strains of footrot, and lice, together with the implementation of soundly based worm control strategies are essential if pastures are to be utilised profitably.

Supplementary Feeding

Supplementary feeding is an important management tool to overcome specific shortfalls in pasture production. This enables more stock to be carried at other times of the year, thereby increasing pasture utilisation.

Supplementary feed costs increase exponentially with stocking rate, and is the cost limiting input. Returns from supplements for wool growth are in the order of 20-30c of wool per dollar of supplementary feed. Feeding sheep to maintain weight over a relative short period will be profitable. Feeding for production is rarely profitable, unless sheep are to be sold prior to the next feed excess, due to the low returns from wool and compensatory weight gains.

Supplementing sheep with high quality protein can increase pasture utilisation of dry feed, but may not be profitable, as the cost of the supplement may be greater than the additional value of production.

EFFECT OF WOOL PRICES

The major effect of changing wool prices is to alter the OSR. At high wool prices, additional costs as stocking rate increases (mainly supplementary feed) will be more easily recouped. This is particularly true when large premiums for finer wool are associated with high wool prices. Conversely, at low wool prices, the additional production at higher stocking rates does not justify the additional costs.

This is also true for extra pasture production. At higher wool prices, potential benefits from improving pasture production will be greater than at lower prices.

A bonus of low wool prices is the lowering in cost of pasture establishment. Part of the cost of establishing a pasture is the loss of productivity when the new pasture is unavailable for grazing. This "cost" will be lower at lower wool prices. Unfortunately, surplus cash for pasture improvement is likely to be severely limited in such circumstances. However, the producer in a sound financial position may well make use of the lower cost of pasture establishment.

GRAZING MANAGEMENT

Grazing management is an integral part of pasture utilisation. Assessing the amount of pasture

available (kg DM/ha), and allocating paddocks to stock on a priority basis are important management techniques to achieve profitable pasture utilisation.

There continues to be much debate between the set stocking and rotational grazing systems. Despite the enormous interest in rotational grazing systems, there is little scientific evidence that rotational grazing increases production *per se*, except on specific pastures (*eg.* lucerne) or at very high stocking rates.

The merits of rotational grazing systems are usually associated with the producer gaining a greater understanding of the feed requirements of the stock, and thereby increasing his/her confidence to increase stocking rates.

ANALYSING YOUR PERFORMANCE

The good manager will be constantly assessing the farm performance. In an all-wether flock, kilograms of wool/ha will give a guide to the efficiency of production. In a self-replacing flock, allowances for the lambs produced will need to be made. As a guide, a ewe which produces a lamb will decrease farm wool production by about 3 kg (2 kg clean).

Production per head is also a useful parameter, as a guide to potential gains from increasing stocking rate. The exact relationship is difficult to define, as it varies with stocking rate, genotype, and pasture conditions. Morley (1987) suggested a 2.5% decrease in fleece weight for each 10% increase in stocking rate.

Inter-farm comparisons have only limited applications, due to inherent productivity differences between properties, differences in facilities (*eg.* labour saving devices), and differences in genotype. Even so, such comparisons may indicate large differences in pasture utilisation, and can provide a useful incentive for improvement to performance.

AN EXAMPLE

In the example below, I have used approximate figures to illustrate the effects of some of the management strategies outlined above. The use of computer models provides a much more accurate and quicker assessment of the impact of changing management strategies on production and profits. The development of such models has provided a valuable means of testing changes before putting them into practice.

The example is not an analysis of specific management practices, but rather indicates the general effect management strategies can have on productivity and profitability. The confounding effects introduced into this example make any specific conclusions invalid.

Three properties have been chosen for comparison. An overview of production and financial data can be seen in Table 2. The production parameters of these properties include:

- *Property 1* is stocked at 8 DSE/ha, lambs in April/May, and sells all wethers off-shears as 1.5 year old stock.
- *Property 2* is stocked at 10 DSE/ha, lambs in July, and retains some wethers.
- *Property 3* is stocked at 12 DSE/ha, lambs in late August, and retains wethers to 5 years of age. Ram percentage is 1.4% (2% on the other properties).

Wool prices were as at 29/1/93, with the market indicator at 501c. The sheep were assumed to be from a 21 micron flock. A 20% increase in wool prices would almost double the advantage of the property 3 over property 2.

No interest or payment of owner's salary is included in the figures. Additional labour required to

Table 2: An example of the impact of different management strategies for 3 properties.

	Property 1	Property 2	Property 3
Area (ha)	600	600	600
DSE/ha	8	10	12
Ewes	2100	2200	2000
Wethers	0	1200	2900
Lambing	April/May	July	August
Winter DSE/ha	9.3	11.3	12.2
Kg wool/ha	32	40	50
Prodn Index	40	50	59
Income-Wool	$63,000	$79,500	$98,300
-Sales	$16,000	$14,460	$ 6,900
Costs			
-Variable	$24,100	$28,700	$33,700
-Fixed	$34,800	$34,800	$34,800
Net Income	$20,200	$30,400	$36,700
Gross Margin/ha	$92	$109	$119
Cost/kg wool (fixed + variable)	$3.07	$2.64	$2.28

run the extra DSEs on Property 3 is included. If the farmer had 90% equity, an additional $10,800 in interest payments would be required. Allowing $20,000 for owner's salary, the Business Return for the 3 properties would then be:

Property 1 - $10,600

Property 2 - $400

Property 3 - $5,900.

CONCLUSIONS

Profitable grazing management depends on the development of an effective management system. Matching animal requirements with pasture availability by timing lambing to coincide with pasture growth, having a high proportion of wethers, running productive sheep, and having sound animal health programs will enable higher stocking rates to be achieved.

As stocking rate approaches the OSR, higher returns will be generated, and opportunities for increasing returns through improvements in pasture production will be greater.

The producer with a system designed for profitable pasture utilisation will continually be rewarded. Additional returns will increase the ability to further improve pastures, and his ability to utilise such pastures will make it more worthwhile to carry out the improvements. If soil tests indicate the country is responsive to fertiliser inputs, such a producer is more likely to benefit from their application, and will be able to justify higher application rates.

On the other hand, a producer not effectively utilising pasture will be faced with the prospect of the "downhill spiral" of production. The lower level of production will mean lower net returns, and the ability to spend money on either pasture improvements or fertiliser will be greatly reduced. In addition, returns from extra money spent will be lower, and may be negative, leading to an erosion of funds. The subsequent lack of inputs into pastures (*eg.* no fertiliser) may further decrease the productivity of the pasture (*eg.* lower clover content) which will further reduce returns and so on.

The development of a system which allows profitable pasture utilisation does not guarantee instant profits. Instead, provided you are able to effectively market your product, it will put you in the best position to maximise returns.

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