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Economics of pasture improvement in the western wheat belt

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The economics of pasture improvement are much more complex than analysing a cropping enterprise because there are more variables, numerous scenarios and unforeseen effects. It is simple to calculate the cost of sowing a pasture. Table 1 identifies the costs of sowing a lucerne pasture. The actual establishment cost is then spread over time. Is the lucerne required for 3 years or 6 years? Does the farmer have the husbandry skills to get 6 productive years out of the lucerne?

Table 1. The cost of lucerne establishment (2005)

	$/ha	Totals ($/ha)
2 × scarifyings	$8.84	
1 × sowing	$5.46	
2 × sprayings	$0.70	$15.00
3 kg lucerne seed (farmer dressed)	$16.00	
50 kg Starterfos (11 kg P)	$21.00	
0.8 L Treflan 480® (wireweed & grasses)	$7.00	
1.0 L broadleaf herbicide	$7.00	
100 mL Lemat 290® (earthmites)	$4.00	$55.00
Total cost per hour:		**$70.00**
Therefore: Cost over 3 years =	**$23.33/ha**	
Cost over 6 years =	**$11.67/ha**	

Note: Costs are based on 2004 prices. Total tractor hours 0.55 hour/ha @ $26.00/hour.

As can be seen from Table 1, a paddock which has been sown down to lucerne for 3 years has an annual cost of $23.33/ha per year. The annual cost may be reduced to $11.67/ha if the pasture has a productive life of 6 years.

Profitable pasture production is dependent on a farmer's agronomic and animal husbandry skills. Maximising profitability is achieved by capitalising on the increased volume and quality of improved pasture. Pasture improvement should be aimed at more than just doubling the volume of feed to support twice as many stock producing the same quality of product. A pasture improvement program should incorporate additional economic livestock improvements or gains, such as:

- increasing the fleece weight of each sheep;
- improving the fleece quality of each sheep;
- increasing weaning percentages;
- increasing carcase weight of lamb and beef;
- increasing the rate of liveweight gains in conjunction with premium market opportunities;
- reducing vegetable fault levels;
- reducing the cost and labour involved in hand feeding;
- reducing mortality rates.

A Merino ewe flock competition in West Wyalong highlighted considerable variations between the flocks. Some factors were due to genetic potentials of bloodlines while others related to pasture and husbandry skills. For example, lambing percentages ranged from 66% to 105%; average wool cut ranged from 6.20 kg to 8.24 kg per ewe; the fibre ranged from 21.5 microns to 23.5 microns; and fleece yields ranged from 63% to 74%.

The first step towards profitable pasture improvement is to budget carefully and to objectively analyse your livestock enterprises (NSW DPI district budget books may be of help with this and with other enterprise assessments). Using your current stocking rate, you will need to calculate 'dollars per dry sheep equivalent (DSE)'. Please note: a DSE is based on a 40 kg tableland Merino wether. Many wethers in our region (western wheat belt) are equal to 1.4 DSE. If you are unsure about DSE ratings, consult your District Livestock Officer.

Table 2. Parametric budget (2005) comparing stocking rate against potential DSE values to produce a guide to gross margin, GM ($/ha).

Note: All variable sheep costs have been deducted to give GM$/DSE.

DSE per hectare	Gross margins ($ per hectare)							
	$5/DSE	$10/DSE	$15/DSE	$20/DSE	$25/DSE	$30/DSE	$35/DSE	$40/DSE
1.7	9	17	26	34	43	57	59	68
2.0	10	20	30	40	50	60	70	80
2.5	13	25	38	50	63	75	88	100
4.0	20	40	60	80	100	120	140	160
5.0	25	50	75	100	125	150	175	200
6.0	30	60	90	120	150	180	210	240
7.0	35	70	105	140	175	210	245	280

There are many pasture improvement scenarios with varying degrees of complexity. This Primefact contains four rudimentary pasture improvement scenarios which may assist with formulating a pasture plan. Table 2 above is a ready reckoner or parametric budget which you can use to make quick validations.

Scenario 1

The first scenario is a simple pasture improvement, with the aim of producing more feed in order to run more stock, producing more of the same quality product. To make pasture improvement worthwhile, assume a typical district mob of Merino wethers, each cutting 6.5 kg of 23 micron wool valued at 722c/kg clean on 'unimproved pasture',[1] with a stocking rate of 1.7 DSE/ha. The DSE value per wether is $15.00, so currently the farmer is achieving a gross margin (GM) of $26.00/ha (see Table 2). Like any other business, satisfactory returns on financial investment are required. The financial goal is to triple the money invested in the enterprise.

If the cost to establish lucerne with a 3 year stand life is $23.00/ha per annum, then the goal is to increase the financial return by $69.00 per hectare to make it a worthwhile exercise. So taking the original gross margin of $26.00, plus the $69.00, sets a target of $95.00 per hectare (see Table 2), equating to 6.4 DSE/ha @ $15/DSE. This is achievable for 20% of regional farmers.

Scenario 2

A second scenario involves a farmer with the same stock as in scenario 1, but the farmer has better agronomic skills and could get 6 years of productive life out of a lucerne pasture, and has the expectation of a $35.00 per hectare increase. The target GM is $61.00/ha, which equates to a stocking rate of 4.0 DSE/ha. This is achievable for 80% of local farmers.

Scenario 3

In this third scenario, where the flock fleece weights are increased from 6.5 kg to 8.0 kg per wether due to better nutrition provided by pastures improved with lucerne, the DSE value would increase to $20.00. The targeted stocking rate, to be rewarding, is reduced to 4.5 DSE/ha on a 3 year stand, or 3.0 DSE/ha for a 6 year stand. These are achievable results for 80% of local farmers.

From the above three scenarios it becomes evident that a close eye needs to be kept on the input costs of pasture improvement. There are very real limits to potential increases in feed production in low-rainfall districts. This consequently imposes a limit on seed and fertiliser inputs, as it is not advisable to compromise sowing preparation and plant protectants.

When contemplating increasing seed and fertiliser inputs, it is advisable to trial test strips in the paddock. The responses achieved in the strip trials should be objectively analysed before investing large sums of money in a whole farm pasture improvement program only to get disappointing returns later.

[1] 'Unimproved pasture' in this region is a euphemism for a collection of annual crop weeds that establish at the end of the cropping phase. It is not a reference to undisturbed native grasslands.

Scenario 4

Another simple scenario is to assess the economic viability of pasture improvement for a steer enterprise. It may also provide insight into the merit for renovating existing pastures.

Assume lucerne is used to renovate an unimproved or drought-damaged pasture. Unimproved pastures produce, on average, 2000 kg/ha of feed per annum. It is reasonable to expect that the lucerne would give an annual increase of 3000 kg feed per hectare (over an unimproved pasture). With a typical feed conversion of 10%, the 'additional' pasture should be converted into 300 kg/ha of beef valued at $2.00/kg, grossing $600.00/ha per annum. That is a total return of $1800/ha over 3 years for an investment of $70.00/ha in lucerne.

Another factor to consider is the benefits flowing to the cropping phase. The most obvious contribution is nitrogen. Anecdotal reports from local farmers growing wheat following a productive lucerne period suggest they have removed in excess of 10 tonnes of grain per hectare in total, from three or four consecutive wheat crops, with urea test strips showing no response. In contrast, wheat recovered from unimproved pastoral land produced only 3.0 tonnes/ha in total from three consecutive crops. The extra 7.0 tonnes/ha of grain equates to 140 kg of nitrogen removed in the grain. This would be equal to 400 kg/ha of urea. With urea valued at $400.00 per tonne, there is a direct financial benefit of $160.00/ha to the cropping phase due to nitrogen fixation from a pasture improved using lucerne.

Conclusion

Pasture improvement in the western wheat belt clearly has the potential to be profitable. The level of success is strongly correlated to a farmer's agronomic and husbandry skills. It would be advisable to take the time to develop the following:

- a physical plan, to improve pastures and livestock, with the assistance of your District Agronomist and Livestock Officer;
- an incisive budget, to produce an economic picture, with the assistance of your accountant.

Note: The preceding scenarios do not consider the need to buy in additional stock or to increase borrowings. The local trend has been to increase the stocking rate of improved pasture paddocks and to crop the surplus (unimproved) pasture paddocks. The average cropping area of district farms increased from 25% in 1990 to 32% in 2001. If you are considering purchasing additional stock to capitalise on pasture improvements, you may need to seek professional advice to determine the feasibility of such a purchase.

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