Improved perennial pasture establishment at 'Ruby Hills'

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Abstract. *The decision making process for the establishment of improved perennial pastures at 'Ruby Hills' is discussed in relation to economic and agronomic strategies.*

Introduction

The decision to establish an improved perennial pasture is never easy because input prices, seasonal conditions and sale prices are all highly variable. The decision to go ahead may also involve factors other than pure economics. I do not purport to know the answer definitively, so I will simply take you through our decision-making process and look at how it has worked financially and strategically for us in recent years. I hope some of my thoughts will be useful in your own decision making process.

To give you an idea of what 'Ruby Hills' is like, I will take you through a few aspects of our business.

Property and grazing business

1. 'Ruby Hills' is located about 15 km west of Walcha on the Northern Tablelands of New South Wales (NSW)
2. Elevation is 1,100 m
3. Average annual rainfall is 800 mm and is summer dominant. We used to believe that good springs were reliable and occurred at least eight out of ten years. This is because our cool climate prevents winter moisture-loss and leads to rapid pasture growth once temperatures rise. That may be in doubt now that we know more about carbon dioxide driving the Southern Annular Mode into positive territory, and the consequent reduction of rainfall from southern weather systems (Climate Change in Australia–CSIRO Technical Report 2007, pp. 27, 106–107)
4. Temperatures range between –15°C and 35°C
5. Property size is 2,100 ha, 50 per cent hilly and 50 per cent arable
6. Soils are trap with some basalt, no granite and a lot of gravelly ridges
7. Phosphorous (P) is adequate for our current production scenario at around 25–30 mg/kg (Colwell) and sulphur (S) levels are good, in the order of 15–25 mg/kg (KCl)
8. Soil pH is quite low at around 4.3–4.5 ($CaCl_2$)
9. Soil tests have revealed variable but elevated aluminium saturation levels ranging from 5–35%
10. Pastures – Microlaena is endemic and old cultivars of phalaris and some aerially sown Demeter tall fescue are well established over the property. We established a new paddock of Jessup MaxP tall fescue in 2003, and another in 2004, and we have sown 25 ha of Quantum II MaxP tall fescue in March this year
11. We employ some winter fodder cropping, mostly using McKellar winter wheat
12. With livestock, our main enterprise is sheep. We have a self-replacing fine-wool flock of 4,000 ewes, a first-cross lamb unit of 1,200 merino ewes and a terminal lamb enterprise of 1,300 first-cross ewes. We breed our own merino rams and sell surplus rams as well. Woolcutters are run on an opportunity basis. We also run a small herd of cows and trade or agist cattle on an opportunity basis
13. Some of the breeding enterprises are under review given the perceived risks associated with climate change
14. Our business plan focuses on 'return on assets' (ROA), rather than productivity as the single biggest economic issue on the farm. The plan also calls for an estimation of our family's economic needs and from there we establish how we are going to generate the cash.

Decision making process

General

We are always looking for ways to grow more feed, or better quality feed without buying more country.

Escalating fertiliser and other input prices mean that instead of an annual blanket fertiliser application across the whole property, we are becoming more targeted in the way we use available resources. We have also identified that blanket application of fertiliser may lead to elevated animal health costs, particularly in relation

to scouring due to over-nutrition of merino sheep in some seasons. It is interesting to note that a similar experience was observed on the high input farmlet at the recently concluded Cicerone Project conducted at CSIRO's research farm 'Chiswick' near Armidale, NSW (*Cicerone Project Final Report 2006*, p14). There is also anecdotal evidence that in superfine wool-growing enterprises, wool staple strength is more difficult to manage on highly fertilised pasture than native pasture with lower fertility.

Therefore, we usually have a specific project in mind when taking the decision to establish a new pasture. Examples at 'Ruby Hills' include: achieving joining weight in young females of both species; finishing lambs or steers; adequate nutrition for twin lambing cross-bred ewes. We also believe that there can be a psychological aspect to having an attractive paddock as an oasis near the house, especially during drought.

Successful farming is often a matter of creating opportunities, and we find that having some improved pasture available is often the key to taking advantage of these opportunities as they arise. For example, in January and February 2008, we measured 220 mm of rain. As our livestock numbers were low following years of drought, we decided not to grow a winter fodder-crop because of an abundance of feed and a shortage of spraying contractors. Ironically, shortly after the cropping window had closed, an opportunity presented itself to contract lambs on a forward basis for delivery in the winter, at good prices. Without a crop, that opportunity may seem impossible, but we may nevertheless have the capability to fill these contracts using a high quality perennial pasture.

From a tax perspective, farming businesses have some blurring of the distinction between capital and maintenance costs, allowing full deductibility for many of the inputs into a new pasture in the first year. However, this concession is balanced by the fact that depreciation is not available as a deduction on the outlay in subsequent years. This will be discussed further later in the paper.

While winter fodder crops have their place, especially when feed-grain can be harvested and stored, the recurrent annual overheads of a fodder crop are a big disadvantage compared to a pasture where preparation costs occur once in the long life of a perennial pasture.

Paddock choice

'Ruby Hills' grows a lot of Microlaena, but it can be a two-edged sword. While it survives well in a drought, it also creates a huge problem with seed in our wool when it gets out of control and becomes reproductive. Young sheep in particular have real trouble dealing with the seed and find it difficult to find green leafy material through the long reproductive stems. There is also the problem of them grazing small oases of short feed and becoming wormy as a result. While it would make good sense to have a big mob of cows to keep this under control, these are not always available at short notice immediately following a five-year drought. We have therefore decided to replace some of our Microlaena with new pasture, as a way around the problem.

This year, 2008, has been a big year for seeding Microlaena, however, we were able to wean 3,000 of our merino lambs onto country that had been sown to improved species, and allowed them to find good conditions away from the uncontrolled native grass pasture. It is difficult to quantify what that facility is worth except to say that discounts for seed infestation in otherwise pristine wools tend to be exorbitant wherever possible. In addition, we value very highly merino lambs that are gaining weight post-weaning, so that they can survive our harsh winter with its consequent fodder deficit. Sometimes, if the lambs can be kept on a reasonable plane of nutrition through winter, it is possible to achieve slaughter weights for merino lambs about Christmas time before they cut their teeth.

We have taken the decision to improve our worst arable country rather than our best. This poorer country is mostly the gravelly ridges with high aluminium saturation percentages and low pH. As a result, it struggles to keep 5 Dry Sheep Equivalents (DSE)/ha going in winter. It is often partly infested with bracken fern, which further reduces carrying capacity. As we need to use lime and lots of glyphosate to establish a good fallow, no matter where we plant, the cost to convert either poor or good country to improved pastures is roughly the same. It therefore makes sense to improve both the quality of feed on offer and available grazing area in the one operation. Thus, we get a bigger percentage improvement in the carrying capacity of the poorer country than in the softer more fertile soils once a vigorous (tall fescue) pasture is established. As an added bonus, the bracken fern has been unable to re-establish in that changed environment.

Timing

Decisions to improve pastures are usually made when stock numbers are low, so grazing opportunity cost is also low.

Never try to plant improved pastures when the Southern Oscillation Index (SOI) is negative or heading south. In 2002, in the face of deteriorating conditions and a forecast El Nino, we abandoned pasture establishment and planted a crop of cereal rye in a paddock fallowed for pasture. In economics, they say never fight the Fed; in this game, we say never fight the SOI.

Risks

The risks associated with establishing a new pasture tend to be over-rated. It is not too difficult so long as a few rules are followed:

- A good fallow is essential – generally, three sprays are needed to conserve moisture by controlling both annual and perennial grasses
- Soil-test intended paddocks
- Do not worry too much about a decline in performance from the initial explosive growth of the first year.

In our moderately high rainfall zone, there will inevitably be some degradation of these pastures because of either drought, or periodic failure to add enough fertiliser to the system. We believe that for a couple of reasons that is not necessarily a disaster, and in some cases may even be intentional. For example, during the 2002–2007 drought years, we made the decision to overstock our improved country in order to maintain some ground-cover on the hills. This was because we wanted to prevent erosion from stormwater run-off, but more importantly, to retain the vast amounts of sheep dung which had accumulated on top of the ground and which contained hundreds of thousands of dollars worth of fertility. This caused some degradation of the improved pasture, but we knew that with care, most of it could be resuscitated. If that were not to be the case, we were prepared to replace it.

Because highly improved pastures will eventually succumb to some degradation, it is very important that most of the cost of establishment be recouped early in the life of the pasture. The enormous overhead of the establishment phase needs to be recovered with a large gross-margin enterprise, usually in the first year or two.

From the accountant's point of view, degradation of the pasture can be seen as a kind of depreciation, but it is one that usually is not deducted for tax purposes. However, this is not very significant as we have usually deducted most of the establishment costs at the front-end of the project rather than call it a capital improvement, which can then be depreciated.

We are finding that where the gaps appear in the pasture, they are usually filled with Microlaena or clover in the sward.

Soil chemistry

We have learned that in our environment it is essential to make sure that the soil-tests are done on time, and that the chemistry is understood. For example, the Jessup MaxP tall fescue pasture we established in 2004 would have been a failure unless we had done our homework. The pH was 4.2 and the aluminium saturation was 35%. We therefore knew that it was folly to proceed without at least 2.5 t/ha of lime. In addition, the result has been very rewarding from both the agronomic and economic viewpoints.

As we use exclusively direct-drill technology, we make our lime application about 12 months ahead of planting to allow time for adequate neutralisation to take effect. It is interesting to note that from some of the research conducted by Mick Duncan during an Acid Soils Project at 'Ruby Hills' in 2000–2003, lime application had a large and quick effect on the aluminium saturation, but only a modest impact on pH (M. Duncan, personal communication). When we are spending so much to achieve a good result, taking chances is not an option.

Economics

I would now like to examine a few aspects of the economics of a conversion like the ones we have done in the last few years. As mentioned before, it is possible and desirable to recoup most of the costs in the first year of production, when very high fodder production is achieved. This is also helped by full tax-deductibility in the first year. Our current budget is shown in Table 1.

Of course, it can be argued that this return should be discounted by the value of the existing enterprise (prior to conversion) to obtain the true marginal improvement achieved by investing $726/ha. However, against this we need to consider:

- That a new enterprise has been established where none existed before. It would be nearly impossible to finish these steers on native pasture
- The productivity of the paddock will have been improved for many years to come
- The flexibility of improved fertiliser response has been added in the improved production paddock.

Gross margin for existing enterprise

7 wethers/ha: $252/ha less costs @ $10/head = $182/ha (360 days)
Net increase due to conversion: $526/ha

This represents 72 per cent of the establishment costs, including 180 days of grazing foregone during fallow. This may seem extraordinary, but the last large paddock we attempted, we recouped about 60 per cent of the establishment costs in a short-term profit-sharing deal using agisted steers. Four years, later that paddock is carrying 700 merino weaners and 50 head of yearling cattle where only 400 wethers were run before. In other words, in year four the paddock is about half as productive as it was in year 1, but it is still twice as productive as it was in the years prior to conversion. It would probably be a little better still, if we returned

to rotational grazing and added some more fertiliser, rather than set stocking.

Maintenance

It should be remembered that once the pasture is established, it needs some fertiliser to maintain vigour. This is probably a little more flexible than is usually understood for the following reasons. Firstly, the real advantage is that improved species will respond rapidly to fertiliser applications, should an opportunity arise. (We have given this a highly technical name – 'revving it up with a bit of DAP'.) Secondly, survival is often better than casual observation reveals. Once again, as part of the Acid Soils Project (now abandoned by NSW Department of Primary Industries), Mick Duncan established a lime application plot inside (and isolated from) a larger Demeter tall fescue paddock established some 35 years ago. To the casual observer, the plant population in the paddock had declined markedly. However, once grazing in the plot was replaced by mowing, the number of surviving tall fescue plants was a revelation. This observation was supported by a species identification transect in the larger paddock which estimated Demeter tall fescue production at about 1,000 kg/ha which was about half of total production when sampled.

Conclusions

What are the general conclusions that can be reached about our pasture improvement strategies?

Firstly, from the purely financial aspect, ROA across the business may initially fall slightly, which paradoxically appears to be contrary to our business plan. We are not alone in that experience. The financial results obtained by the Cicerone project were similar in that the high input farmlet ended up with the highest production and gross margin of any of the three management systems (*Cicerone Project Final Research Report*, August 2006, p 26). However, production was initially constrained by the large proportion of the farm left unproductive during the establishment of the new pasture. Also, on that farmlet, the capital cost of improvement was not included as part of the gross margin. This serves to reinforce the point that a high gross-margin enterprise is needed initially to pay for the establishment overheads. It is important to include the opportunity cost of fallow in that list of overheads. So why take the risk?

As mentioned earlier, successful farming is often about creating opportunities, and that usually includes flexibility. These improved pastures, once paid for, can be used for a number of strategic purposes and can be 'revved up' or down as the seasons and markets unfold, for a fraction of the cost of initial establishment.

Table 1. Current budget for first 12 months of a new pasture

Costs

Item	Price (Ex GST)	Units	Cost/ha
Lime (spread/t)	$70	2.5 t/ha	$175
Herbicide:			
Roundup Power Max/L	$18	5 L/ha	$90
Surpass/L	$5.5	3 L/ha	$16
Application/ha	$16	3 sprays	$48
Seed/ha	$9.50/kg	19 kg/ha	$180
Fertiliser (40 kg bag)	$54/bag	2.5 bags/ha	$135
Contract sowing	$82/ha	1.0	$82
TOTAL			($726)

Income

Item	Price (Ex GST)	Units	Income/ha
Production: 2.5 steers/ha = 20 DSE/ha (rotational grazing) x 180 days @ 1.0 kg/head/day		450 kg beef/ha	
Sales	$1.75/kg	450 kg beef/ha	$787
Cost of sales and opportunity cost of cattle @ 10%			($79)
NET			$708