Pasture Improvement - Expensive indulgence or economic necessity

Cyril Wills

"Weona", Mandurama 2792

Our 985 ha property, "Weona" is located 13kms west of Mandurama on the Canowindra road with an elevation of 660-720 metres and an average annual rainfall of 675mm. The soil types are derived from shale and predominantly red in colour. There is some limestone on one corner of the property.

The property runs a 500 cow breeding herd plus progeny and replacements. Up to 600 steers are backgrounded for Rangers Valley feedlot depending on seasonal conditions. These enterprises are based on a mixture of improved and native pastures.

Background

My early years were on my family's dairy farms around the Berrima district. Firstly on a 65 ha farm at Kangaloon. This property was steep and stony, but highly productive country of rich basalt soil.

In 1965 we moved to Mittagong on to 160 ha of poor, grey slate based soil. This was when my father employed an agronomist, Graham Umbers, originally from New Zealand, to help develop the land into a productive dairy. They were using what, at the time, were to be considered very radical methods. This included extremely high rates of lime application, up to 7.5 t/ha of lime in combination with 625-750 kg/ha of single super, 250 kg/ha potash and 250 kg/ha nitram and trace elements based on soil testing done of each block. In subsequent years fertiliser was applied as soil tests indicated necessity.

This treatment produced spectacular results in pasture production. Mainly using Victorian perennial ryegrass, Porto and Currie cocksfoot, Haifa white clover, red clover and a variety of subclovers.

After some years of this type of treatment pasture production continued to be excellent, but metabolic imbalances began to appear in our dairy cows. There were high rates of *Hypocalcaemia* (milk fever), *Hypomagnesaemia* (grass tetany) and *Ketosis* (acid anaemia) as the major problems. On the practical level, a decrease in fertility was becoming evident.

After much discussion and research we changed our fertilising strategies, using less chemical fertilisers and more deep litter foul manure. At the same time we began to use feed supplements to correct dietary imbalances in the cows. Unfortunately, we did not get a chance to fully evaluate the results of these changes as the decision was made to sell our dairy herd and the three farms we owned at Mittagong and relocate to Mandurama in 1979.

Fortunately, we were able to purchase land in Mandurama which had great potential, but very little structural or pasture improvements. Since 1980, we have continued to purchase land as it became available. By 1992, we had acquired about 2400 ha. At this time my father decided to retire on 280 ha and the rest was divided between my brother Ross and myself. Ross retained the land originally purchased in 1980 and I took the 1000 ha section later purchased in 3 blocks.

This country was mainly in a cleared but undeveloped state, covered in dead timber, dug out rabbit warrens and a variety of weeds, including St John's wort, Patersons curse, serrated tussock, Scotch thistle and blackberries. Amongst this were small areas which the previous owners had used as their permanent cultivation areas. These areas were in a severely degraded state.

Pasture establishment

Since 1992, I have continued the pasture establishment program started in 1989. Approximately 480 ha have been sown to improved pasture using Victorian, Ellet, Brumby and Advanced rye, Porto, Currie and Wana cocksfoot, AuTriumph fescue, Holdfast phalaris, Haifa and Tahora white clover, Goulburn, Denmark, Woogenellup, Junee, Trikkala subclovers and Balansa clover. The varietal mix sown depends on soil types, drainage and situation.

Figure 1: Pasture types on "Weona".

My plan is to have a mix of pasture types which allow me to take advantage of rainfall at any time of the year. Due to the condition of the land I have been using predominantly conventional farming methods to prepare country for pasture improvement. Usual-ly in the first year I spray in early summer with Roundup® at 1.0 L/ha before seed set of existing species and then use dry cows to graze the area as short as is practical. After it has began to yellow off, it is then cultivated for the first time usually in early February. This reduces the chance of erosion by heavy summer storms.

After this first working lime is applied if necessary and a second working is completed. Both these cultivations are usually done with a scarifier fitted with 8" points to ensure a thorough disturb-ance of the soil surface. This method leaves a fairly rough surface, but does a good job of levelling out a lot of stump and rabbit holes, but makes it necessary to harrow to create a suitably smooth seed bed. Depending on moisture availability, oats is usually sown in late February or early March and used predominantly for grazing with only a small area stripped after grazing to provide for seed needs.

In the second year the paddock is grazed and sprayed as is necessary to prevent seed set and in the later part of the year to retain soil moisture reserves. If the seed bed is still rougher than I would like, it is cultivated again with a scarifier. For pasture sowing I use a conventional combine with conveyor belting fitted over the rear tines to flatten the seed bed and prevent burying of the seed or alternatively sprayed for a final time and sow using a Caldow or similar direct drill machine.

Using the conventional method sowing usually takes place during late March or early April. This seems to allow time for good seedling establishment before the onset of winter and also avoids the chance of the soil getting too wet and preventing sowing at all. For the last two years I have tried direct drilling in June and July with very limited success. In 1998, I have used the direct drill method, but reverted back to my normal time of sowing (late March or early April) and now wait to see whether I will have more success.

Without having any supporting data I believe that the mid- to late-winter sowing time I have previously been advised to use does not suit our extremely cold and wet soils. In both years I have been able to identify good initial germinations of pasture species but by spring a good many of these seedlings have died. As far as I can determine these seedlings have died from extended periods of waterlogging. These conditions don't appear to affect the pasture sown in autumn nearly as much as they have had more time to establish a root system and some energy reserves. This is a brief outline of my yearly work practice. Now I will try to answer the question.

Pasture improvement - expensive indulgence or economic necessity?

Firstly, my thoughts are directed by the evidence I have collected in the production of beef on the Central Tablelands. But I believe that many of the same imperatives exist whether you are producing wool or prime lambs.

It is my belief that pasture improvement using introduced grasses and legume species is an economic necessity under todays climate of rising costs (both business and personal) and static or in some cases falling commodity prices. Most rural producers are finding their incomes have shrunk markedly in real terms over the last 20 years.

First lets examine the initial and on-going cost of pasture improvement compared to maintaining a naturalised pasture.

1. Improved pasture

Year 1 Costs

Stick-raking and timber removal $25/ha
Oat crop preparation including soil tests ($93/ha)
Sowing, seed and fertiliser ($123/ha)
Herbicides, insecticides and application ($7.95 /ha)
Total = $248.95

Year 1 Income

2.6 hd/ha for 150 days = 312 kg LWG @ $1.10/kg = $343.20
Gross profit = $95/ha.

Year 2

Establishment Costs

Knock down spray ($25/ha)
Soil Preparation ($60/ha)
Sowing, seed and fertiliser ($141/ha)
Herbicide, insecticide and application ($7.95/ha)
Total = $233.95/ha

Year 2 Income

Jan-March - maintain 0.66 hd/ha dry cows
April-August - out of production
Sept-Dec -1.5hd/ha @ 1.5kg/ha day weight gain = 180 kg wt gain @ $1.10/kg = $198/ha
= $35/ha loss

2. Naturalised pasture

Year 1 Costs

Fertilised natural pasture from May-September without supplementary feed.
Fertiliser - typical application 125 kg/ha single superphosphate ($36/ha)

Herbicides and application ($5/ha)
Total = $41/ha.

Year 1 Income

Jan-May - 0.66 hd/ha 18 kg LWG @ $1.10 = $20
May-Sept - 0.66 hd/ha 150 days = 10 kg weight loss=$11/ha
Oct-Dec - 1.0 hd/ha 0.75 kg/day = 67 kg gain @ $1.10 = $73/ha

Year 2 Income

Jan-March - maintain 0.66 hd/ha dry cows
April-August - 0.66 hd/ha = 150 days 10 kg loss/hd = $11/hd loss
Sept-Dec - 1.0 hd/ha @ 0.75 kg/day = 99 kg wt gain @ $1.10 = $109/ha
Gross income = $98/ha

Year 2 Cost

Fertiliser 125kg/ha single super ($36/ha)
Herbicides and application ($5/ha)
Total costs = $41/ha
Profit = $46/ha.

In Year 2 the difference = $81/ha in favour of naturalised pasture. At the end of 2 years we are looking at a line ball situation.

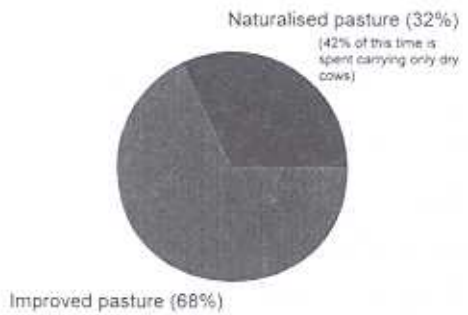

Figure 2: Number of animal days spent on each type of pasture

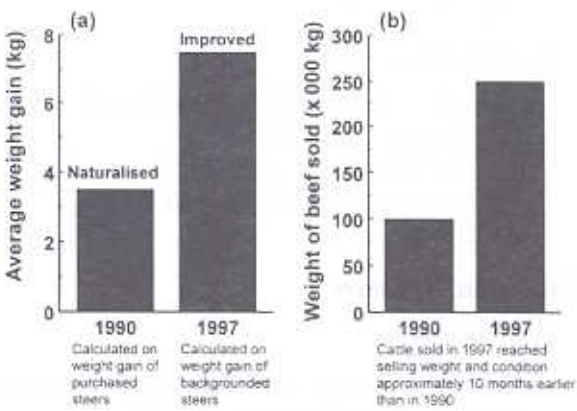

Figure 3: (a) Average weight gain of steers, and (b) Weight of beef sold in 1990 and 1997.

Year 3 and beyond

Costs: Improved Pasture
Fertiliser and application ($56/ha)
Herbicides and insecticides ($8/ha)
Total = $64/ha

Costs: Naturalised Pasture
Fertiliser and application ($36/ha)
Herbicides and application ($8/ha)
Total = $44/ha

Income: Improved pasture
0.9 cow and calf equivalent/ha = $270/ha gross with some winter supplementary feed 500 to 600 backgrounding steers.

Income: Naturalised pasture
0.4 cow and calf equivalent/ha = $120/ha gross maximum carrying capacity with winter supplementary feeding.

Gross income: Improved
$214/ha income after maintenance costs are deducted.

Gross income: Natural
$79/ha income after maintenance costs are deducted.

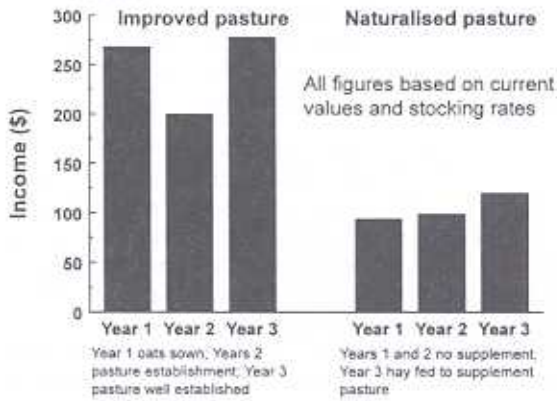

Figure 4: Year 1, 2 and 3 income during establishment phase of improved pasture and for a naturalised pasture

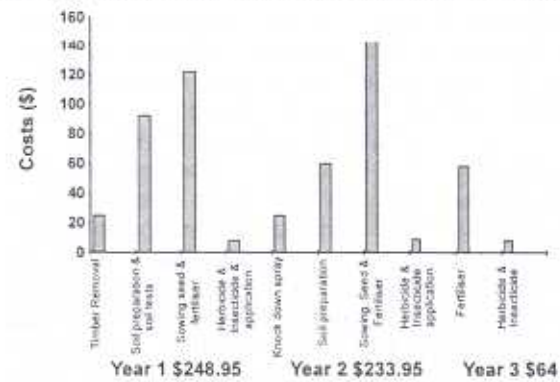

Figure 5: Year 1, 2 and 3 costs of establishing pasture.

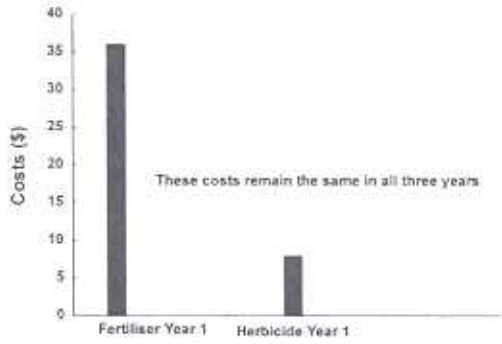

Figure 6: Year 1, 2 and 3 costs of maintaining natural pasture

These figures are based on actual figures from "Weona" and only take into account costs relating to pasture improvement and natural pasture country. All other costs involved in running a farm of this size remain constant whether pasture improvement is carried out or not.

These figures show an increase of $135/ha gross income is attainable through pasture improvements after a two year establishment phase when income is approximately equal.

Using the figures you have just read I believe that to remain viable, pasture improvement is not desirable but necessary for future economic viability. Some of the reasons for this being, the native grass species in this area have a short growing season which severely restricts their productive ability. Mature plant material also has low palatability and digestibility which further restricts production. Even with application of fertiliser the dry matter production per hectare is much lower than with improved pasture species.

In compiling the data to present this paper I was amazed at how the figures favoured pasture improvement compared to naturalised pasture. I suspect that like many others producers I had all the information needed to prove what I already knew, but had never taken the time to compile it.

This exercise has only served to convince me even more strongly that without pasture improvement we will be reduced to little more than subsistence level food and fibre producers. We will in that case fall further and further behind the income levels and living standards experienced by our urban counterparts.

Unless this trend is turned around the inevitable consequence is an ever-ageing rural workforce and ever increasing likelihood of our best and brightest young farmers leaving the land.