Making native pastures pay

John Betts, "Cowridge", Yass

We live in a vast and ancient land and after Antarctica, Australia is the second driest continent in the world, with shallow and fragile soils, the majority of which are not particularly fertile.

Over the millions of years our native vegetation has evolved to be sustainable, whether in Australia's tropical north or the cooler southern latitudes.

The continent is subjected to climate extremes, heat and cold, drought flood and fire. Our native plants by natural selection over the eons of time have learnt to survive these events, and quickly regenerate.

The aboriginal custodians of the land understood this, and used fire as part of their land management to bring about a renewal of regeneration.

Then came white settlement. These new settlers brought with them European methods of farming and land management. They cleared the land, ploughed the soil, grew their crops and grazed their stock, without fully understanding or realising how vastly different the Australian environment was from the northern hemisphere.

As the years passed, problems appeared, with soil erosion from wind and water. Some of the plants and animals imported from overseas became and still are feral, overrunning our native fauna and flora.

Dryland and wetland salinity raised its ugly head causing more problems. Sadly, many of these are still with us, and the battle against them is still to be finally won.

Much progress has been made in the last four decades to address and correct the environmental problems but at the same time maintain viable farming enterprises. With cooperation between farmers and governmental agencies, much is being achieved.

Careful selection and trialing of many imported perennial grasses and legumes have greatly lifted the stock carrying capacity on the more arable land in Australia. There is no doubt the introduced pastures have greatly contributed to the development of valuable export markets for wool, mutton, dairy products and beef, as well as satisfying local demand.

Much improved land and cropping management and the development of various strains of grains suitable for the Australian environment, have also helped build up a very valuable grain export industry for this country yet maintained a viable return for growers without damage to the soil as in the past.

Native grasses, I believe have an ever-increasing contribution to these industries as a management tool to help boost production and stabilise the land.

For example, in the Yass district, after periods of drought, not all introduced species have survived particularly well on the lighter soils. Some farmers, who ploughed out good native pastures to establish expensive introduced grasses, have found they now have stands dominated by *Vulpia* (silver grass) and not much else, and have become very disillusioned as a result.

However it is in the great wool industry that native grasses have played a major role. Australia has a well-earned reputation of growing the best wool fibre in the world, and it has largely been responsible for the early prosperity of Australia. Some of the best quality wool is grown from native grasses. It was so at the beginning of the industry and it is still so.

Well managed native perennial pastures will produce fine micron and strong tensile strength wool fibre, the two most important criteria wool manufacturers demand, and which largely govern the price paid at auction. It surprises me that the link between good quality native grasses and wool produced has not been recognised until recent times.

NATIVE PASTURES ON "COWRIDGE"

I have been a fine woolgrower for most of my life and have bred up a line of Saxon merinos of reasonably high standard on my property of over 500 hectares near Yass. I also manage another property of similar size on which I

Table 1 Wool production from two properties in the Yass district

Property A: Introduced pastures, some native grasses and superphosphate applied

Micron	Yield	VM	Length	CV%	Strength	Break	Cut per head	Sheep per Hectare
19.6	73	0.70%	85mm	13	36N/KT	Middle	5Kg	5

Property B: Native pastures (mainly wallaby grasses) with naturalised sub clover and superphosphate applied

Micron	Yield	VM	Length	CV%	Strength	Break	Cut per head	Sheep Per Hectare
19.3	74	0.50%	83mm	13%	40N/KT	Middle	4.8	4.5

run fine to superfine wool sheep and I have also leased country from time to time.

My own property is reasonably fertile and is heavy carrying country, with a mixture of native and introduced species of grasses while the other property contains mainly native perennial grasses. Both properties have had superphosphate applied and there is sub clover throughout the natural pastures.

Table 1 provides a comparison of wool fibre production between property A and B. The properties are only 10 km apart.

The average returns from 1992-1997, on stock of the same bloodline, and shown in October were:

Property A

Price/Kilo over consecutive years $4.93.

Return/hectare $123.11

Property B

Price/Kilo over the same consecutive years $5.56.

Return/hectare $128.25

FERTILISER TO IMPROVE NATIVE PASTURES - EXPERIMENTAL RESULTS FROM "BOOKHAM"

"Bookham" is an experimental site set up in 1993 after a request from local wool producers to investigate "Does it pay to put superphosphate out for fine wool production". The Bookham site is west of Yass.

Phil Graham, NSW Agriculture at Yass, has been involved in this comparative trial on fertilised and non fertilised *Microlena* pastures over the past five years. I wish to acknowledge Phil Graham's work and I am indebted to him for supplying the information set out below.

This demonstration started in December 1993 and is planned to run long term. A 12 hectare paddock on the property was split to form 2 paddocks. One side was to receive no super and the other to be supered each year. The following treatments have occurred to the super side:

1993 June	250 kg/ha
1994-1998	125 kg/ha applied each year
1999-2000	62.5 kg/ha applied each year
2001	125 kg/ha
2002	90 kg/ha

Prior to the paddocks being used for the trial they had not received super since approximately 1975. The pastures are mainly *Microlaena* and *Danthonia*, with annual grasses and naturalised legume. These native pastures are on a granite soil with pH of 4.2 with a B horizon consisting of heavy clay at 50 cm.

Stocking rates on the No-super side have been set at a farm average for this type of country. Stocking rate on the Super side is set to try and maintain a similar live weight on wethers on both sides. If body weight is kept the same, wool characteristics should be similar. Wethers have been run to date under set stocking.

Stocking rate on the Super side has increased from 11 wethers/ha to 14.9 wethers/ha over the life of the trial. The No-super side has remained at 6.3 wethers/ha.

Supplementary feeding to date only occurred in 1998 on both paddocks.

The following summarises wool production for the trial to date.

Averages for the period Nov 1993 to Nov 2001

	Super	No Super
Stocking rate/ha	12.9	6.3
Total Clean wool kg/ha	44.9	21.5
Total wool income $/ha	398.25	189.29
Total cost $/ha	251.19	140.88
Profit $/ha	147.07	48.41
Difference Super - No super $/ha profit	98.66	-
Cost of production cents/kg clean	5.65	6.52
Fleece details		
Fibre diameter mm	19.5	19.4
Yield (%)	72.5	72.4
Length mm	91	91
Strength N/Ktex	37.5	38.1
Clean wool kg/hd	3.48	3.41

Dennys Garden and Col Langford, NSW Agriculture, Queanbeyan and CSIRO are also conducting similar trials mainly on *Danthonia* pastures in the Yass district and Peter Simpson, NSW Agriculture at Goulburn, has been working on the benefits and management of native grasses for many years with very positive conclusions.

The Ligule Project and the Stipa group are other organisations who are working on the establishment and benefit of native grasses and it is heartening to see these individuals and organisations devoting their time in assessing the worth of native grasses.

GRAZING MANAGEMENT TO IMPROVE NATIVE PASTURES

The second approach to increasing return from native grasses involves stock management.

My family attended a Prograze program conducted by Phil Graham, NSW Agriculture, Yass, and I thoroughly recommend this course for anyone who wishes to upgrade their knowledge of pasture and stock management to lift their financial return with sustainable land management.

Having successfully completed the course we decided to "bite the bullet", and launched into intensive rotational stock grazing.

Sheep are run at approximately 25hd/ha (10/acre) and are moved when the pasture averages 25mm in height or 600 DME and returned to the paddock when the grass averages 100mm in height. The paddock sizes are in multiples of 20-25 hectares.

Since we have started this program of stock management the results have proven to be quite impressive.

Wool cut per head and per hectare have improved and the average micron has dropped by at least one and tensile strength has increased by 10 12 neutron/kilotex.

Perhaps the most noticeable result of all has been the response of the pasture. The pastures have responded to the graze/spell regime by growing more vigorously, with less weeds, and a lower rate of fertiliser has been required to maintain the pasture.

The most impressive result of all is the variety of native grasses and forbs that have re-appeared and become more vigorous in growth. I think this is due to a pruning effect and allowing the plant to send up new growth and seed heads during the spelling periods. This in turn stimulates the plant's root system to become more vigorous and penetrate deeper into the subsoil.

I have found also that this in turn has extended the growth period of the plant for at least another four weeks into summer without rain. This also effectively lowers the water table. To allow the pasture to set seed for recruitment, even though they are perennial, as part of the rotational management is important. They are now allowed to set seed every few years.

Microleana and *Danthonia* have responded to this grazing regime, and have thickened up over a period of time. Kangaroo grass (*Themeda*) and possibly red grass require more careful management. They can be crash grazed but only for short periods of time and then spelled. Grazing, slashing or winter burning can stimulate the grass plants in spring to send up a good crop of viable seed in summer.

Care must also be exercised with fertiliser - too much superphosphate or lime will tend to kill kangaroo grass. There are possible alternate fertilisers that may be of benefit. For instance, we have noticed the kangaroo grass grows more vigorously around ant nests. Whether it is due to soil aeration because of the ant tunnels or some sort of nutrient secreted by the ant I do not know but it is an area for which research may find the answer.

NATIVE PASTURES FOR SEED PRODUCTION

Finally another side to increasing income from native grasses is harvesting and selling the seed, for re-establishing elsewhere.

Troy Wilson and I have designed and built a native grass seed harvester that by changing the harvesting heads will harvest a wide range of grasses both in open and remnant areas reasonably quickly and accurately.

We have also developed seed cleaning machines for some of the grasses and are still working on this particular challenge.

Our proceeds from seed sales so far have returned into research and development but we hope to derive an income from this one day.

In the past, native grasses have been largely looked down upon in agriculture, but I believe they will play an increasing role in maintaining a viable agricultural return to farmers, and a sustainable and enhanced environmental land management for the present and into the future.