

GRAZING INDUSTRIES OUTLOOK:

THE NEW SOUTH WALES PASTURE BASE

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SUMMARY: Pastures are amongst the Nation's most valuable asset, being the feedbase for livestock products valued at about \$2.6 billion in NSW. Pastures also contribute significantly to crop production and to sustaining the primary soil and water resources. The pasture scene in NSW is very complex, as 16 distinct agro-ecological zones are recognised with different species and variety adaptation. Results of a pasture survey of District Agronomists indicates that there are over 10 million hectares of sown pastures in NSW, representing some 20% of all pastures. Subterranean clover and phalaris are the most widely sown legume and grass species, respectively. There is ample evidence that the condition of many pastures in all regions in NSW is in decline. The challenge for the future is to reverse these trends to ensure that the Nation's livestock products remain internationally competitive.

The Nation's wealth was created from its agricultural industries, particularly from wool. Pastures effectively underpinned this wealth creation. It is therefore arguable that pastures and rangelands are the Nation's most valuable asset. It often takes disasters such as drought to bring this message home, both in terms of depletion of feed supplies for livestock and protection of our soils and water resources.

The actual value of pastures and rangelands is difficult to determine, and certainly varies from year-to-year with fluctuating prices of livestock commodities. Likewise, it is difficult to estimate the contribution of pastures to crop production and to their role in sustaining soil and water resources. From the 1991/92 Australian Bureau of Statistics, the total value of wool, lamb, beef and milk produced in NSW was \$2.6 billion (Table 1), the majority of which is directly attributable to pastures.

The value of pastures in cropping rotations has long been recognised, but there has been a tendency away from inclusion of pastures in rotations in NSW in favour of bare fallows and alternative crops, particularly grain legumes. There is now evidence that these systems are not sustainable, and a return to the inclusion of a pasture phase will be essential in many areas to overcome problems such as weed invasion, nitrogen deficiency and soil physical decline. Cereal crops are valued at about \$1 billion annually in NSW (Table 1).

Table 1. Value of agricultural production in NSW for 1992/93 (Australian Bureau of Statistics).

Product	Value (\$ m)
Cereal grains	1001
Pasture seed	7
Pasture hay	121
Wool	973
Sheep	160
Meat cattle	965
Milk	366
Total pasture based products	2592

In other problem areas, deep rooted perennial pastures are essential to overcome rising water tables which predispose soils to dryland salinity, and to recycle nutrients, particularly nitrogen, to reduce acidification.

The aim of this paper is to describe the pastures and rangelands in NSW and to provide a brief overview of their condition as a basis for targeting research and development resources to ensure that this most valuable resource is maintained and improved to meet the ever more specific market requirements of our livestock and crop products, and to preserve the primary soil and water resources.

Agro-ecological zones of NSW

NSW is an extremely variable State in terms of climate and soil type. As a consequence, the range of pasture types, pasture species and varieties also

varies enormously, ranging in climatic adaptation from semi-tropical to cool temperate, from high rainfall to semi-arid, and from summer to winter rainfall.

For the purposes of pasture recommendations, NSW is divided into 16 agro-ecological zones to reflect these differences and to group pasture species and varieties with similar adaptation characteristics. The extent of the range in adaptation across NSW is indicated by the fact that 53 species and 130 varieties of pastures are recommended for use in NSW pastures. In addition to sown species, large areas of native and naturalised pastures remain in NSW and contribute significantly to livestock production, and to sustaining soil and water resources. There are over 700 species of native grasses in NSW (Lodge *et al.* 1990).

National pasture survey

For any resource, it is important to describe its extent, potential value and condition to facilitate better planning to develop and utilise the resource in a more efficient, effective and sustainable manner. While the Australian Bureau of Statistics (ABS) census provides some information on pastures, this is not sufficiently detailed to be used effectively in planning and prioritising resource allocation to specific issues and areas. A national survey of District Agronomists (or their equivalents in other States) was therefore undertaken in 1994 to provide a more comprehensive description of the Nation's pastures. This survey was supported by all State Departments of Agriculture and by five Rural Industry Research & Development Corporations.

Survey methodology

For each local government area (LGA) within their districts, District Agronomists were asked to *estimate* the area of different pasture types as a proportion of the total area of pasture in the LGA. For each pasture, the species composition was also requested, together with estimates of carrying capacity, types of livestock grazed, pasture condition *etc.*

At the time of writing of this paper, the data had only been subject to preliminary analysis. The areas of pasture types containing each pasture species, regardless of percentage composition, were simply summed to provide an estimate of the proportion of each LGA containing some presence of each species. An estimate of the actual areas (hectares) was then calculated using the ABS estimate of the total area of pasture in each LGA for 1991/92.

During this exercise, it became apparent that the ABS data for pastures are incomplete, as indicated in Table 2. This shows that for NSW, almost 53%

Table 2. Area of pastures and crops in NSW (Australian Bureau of Statistics).

ABS Category	Area (million ha)
Total holdings	60.14
Total Pasture	21.83
Total crops	3.83
Total fallow	1.55
Total unavailable land	1.18
Area unaccounted for ¹	31.74
¹ calculated by difference	

of the total area of all holdings is unaccounted for in the statistics. Other data indicate that only about half of all respondents fill in the pasture questions while 67% and 59% respond to the cattle and sheep sections respectively.

Following consultation with the ABS, it was confirmed that areas of pasture are only entered into the ABS data-set if a response is given on the census forms, and no attempt is made to adjust the data for respondents who do not complete this section of the census. I have therefore reapportioned the unaccounted for area on the basis of the relative areas of crops:fallow:unavailable:pastures given in Table 2. This may underestimate the total area of pasture, as a higher proportion of respondents fill in the crop sections of the census. Further consultation will be required with ABS to refine these estimates.

Although the data are preliminary and much more refined analysis will be required, the data provide at least a useful estimate of the relative importance of our main pasture species.

Survey results

The most widely sown pasture species in NSW are listed in Table 3. These data indicate that unimproved native pastures account for about 62% of all pastures in NSW, including semi-arid rangelands in western areas of the State. Of the remainder, about 17% is estimated to be improved native pasture (either fertilised or sown to a legume), while about 20% of all pastures have been sown, amounting to about 10m hectares of NSW. To put this figure into context, the total area of all farm holdings in the northern tableland shires of Tenterfield, Severn, Guyra, Dumaresq, Uralla and Walcha is about 2 million hectares.

The most widespread sown species is subterranean clover which is present in 15% of all pastures, or about 7 million hectares (Table 3). White clover and lucerne are the next most widely sown species, followed by phalaris, cocksfoot and annual medics.

The estimated areas for lucerne and phalaris are much higher than previous estimates reported by

Table 3. Preliminary estimates of the area and percentage of pastures in NSW containing some presence of the major pasture species.

Pasture species	Area sown (m ha)	%
Subclover	7.17	14.8
Annual medics	1.01	2.1
Serradella	0.11	0.2
Lucerne	2.16	4.5
White clover	2.88	6.0
Phalaris	1.63	3.4
Tall fescue	0.51	1.1
Perennial ryegrass	0.73	1.5
Cocksfoot	1.04	2.2
Annual ryegrasses	0.19	0.4
Improved native pasture	8.15	16.8
Unimproved native pasture	30.28	60.5
Total area of pasture	48.43	
Total area of holdings	60.13	

McDonald (1989) and Watson (1993), respectively. Watson undertook his survey of District Agronomists in 1989 and estimated 0.8 million ha of phalaris. Some increase in sowings would have occurred since that time. A comparison of the two data sets would seem to confirm this trend, particularly in more marginal western slopes and southern tableland areas of the State, but it is unlikely that the area would have doubled to the 1.6 million ha found in this survey. McDonald simply took his lucerne data from ABS statistics which provides estimates of "pure lucerne" of around 0.5 million ha. This does not account for lucerne sown in mixtures, and would also be subject to the same poor response rate as other pasture questions. Exclusion of pastures with, say, less than 5% of each species may also provide a more appropriate estimate from the current survey.

Although the error margins in the above preliminary estimates are obviously higher than desirable, the data do provide some basis for setting *relative* priorities for research and extension. For example, cocksfoot is perhaps the least researched species, but it is obviously widely grown in NSW, and perhaps should be allocated more resources. Within NSW, active publicly funded species improvement programs are underway on all the species listed in Table 3, with the exception of cocksfoot and annual ryegrasses. However, private sector breeding programs are also addressing the need for improved varieties, including these two species.

The survey provides a basic data-set which can be refined and built upon in future when more rigorous methods can be developed to estimate areas sown to pasture species. Further analysis of the present survey data will also provide more accurate estimates than have been possible at the time of writing, and will also provide indications of the

composition and productive state of the pastures. It is planned also to produce maps of the areas sown to the different species, and to determine areas of potential adaptation as a basis for possible expansion of pasture sowings into new areas. Economic analyses are also being undertaken to determine the potential benefits to be derived from a marginal improvement in particular characteristics of pasture species. These analyses will further enhance our ability to set priorities for research and extension.

Condition of NSW pastures

Questions were included in the survey to estimate the condition of pastures, but these data have not been analysed. There is however, considerable evidence, both real and anecdotal, that pastures are in a state of decline in many areas of NSW. In a paper which I co-authored for the 8th Annual Conference of this Society (Archer *et al.* 1993), the extent and causes of pasture decline were reviewed. It was concluded that "The evidence strongly supports the case that pastures have declined to the extent that botanical composition and production of many pastures is now far from a desirable optimum, and almost certainly does not reflect the composition at establishment". The main causes of pasture decline were listed as (not in order of importance): soil physical degradation, dryland salinity, acidification, declining fertility, climatic influences, inappropriate grazing management, and pests and diseases.

In a recent report from the Meat Research Corporation on results of a producer survey across temperate areas of eastern Australia (Lees and Reeve 1994), about 35% of producers felt declining pasture quality is a problem in their district. However, in some districts such as Glen Innes, over 50% felt there was a problem. When producers were asked if pastures were in decline on their own properties, a much higher proportion indicated a problem existed *e.g.* Tamworth (50%), Glen Innes (82%). The most frequently mentioned pasture problems across all areas were: weeds (35%), poor persistence of species (27%), acidity (15%) and fertiliser use (15%). The main causes given by producers for pasture decline were: dry seasons (47%), not enough fertiliser (42%), rain at wrong time (40%) and weed invasion (34%). These results generally confirm that pasture decline is very real and must be addressed if our livestock industries are to remain internationally competitive.

Future challenge

Despite the increase in importance of supplementary feeding and feedlots for producing milk and finishing stock, pastures will remain the most important component of the feedbase for Australia's

livestock industries, and arguably the most important single factor affecting efficiency of livestock production, due to their influence on livestock nutrition. High quality, persistent pastures will therefore continue to be the key element in ensuring that this Nation's meat, wool and milk products remain internationally competitive.

The World's markets are now demanding quality and consistency of its food and fibre products, and this means that we must ensure that pastures are able to supply appropriate nutrients to produce livestock to market specifications, and that we are able to objectively plan and monitor pasture production and livestock performance in the paddock to meet these targets.

The challenge for the future therefore is to identify the cause of problems associated with pasture decline and to develop and implement sustainable and profitable pasture systems which can be integrated on a whole farm basis to consistently meet production targets and product specifications.

This will obviously require a much more comprehensive understanding of the extent and condition of the resource base - the pastures of Australia - to ensure that we target research and development resources to achieve the greatest impact, thereby maximising our ability to retain a competitive edge in World markets.

References

- Archer, K., Read, J. and Murray, G. (1993). Pasture decline - real or imagined? *Proceedings of the Eighth Annual Conference Grasslands Society of New South Wales*. pp. 8-13.
- Lees, J. and Reeve, I. (1994). Temperate Pasture Sustainability Key Program 1994 Producer Survey. Report to the Meat Research Corporation.
- Lodge, G.M., Robinson, G.G. and Simpson, P.C. (1990). Grasses - native and naturalised. Recognition, value and distribution. *Agfact P2.5.32*, NSW Agriculture.
- McDonald, W. (1993). Recommended pasture varieties 1993-1994. *Agfact P2.1.10*, NSW Agriculture.
- Watson, R.W. (1993). Phalaris. *Agfact P2.5.1*, NSW Agriculture.
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