Agriculture in the wimmera; looking back and planning ahead

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Summary. The location, rainfall and major soil types of the Wimmera are described, and trends in the field crop industries examined. These include the practices of long fallowing, rotation with medic pastures and more recently, the introduction of grain legumes. It is postulated that soil nitrogen levels are falling to sub-optimal levels with intensive cropping practices and that an economically competitive livestock enterprise is needed to address this problem. The need for work on various sub-units within the main soil type (Ug) is also highlighted.

Introduction

The Wimmera region of Victoria lies in the western part of the state extending approximately 250 **km** from the border with South Australia, and occupies the centre portion of that area. The Grampians and Pyrenees ranges occur in the south east, while the Wimmera plains cover much of the land to the north. Pastoral industries are dominant in the foothills adjacent to the ranges and in southern parts while field crop production is the dominant industry in the central and northern Wimmera.

The Wimmera supports a substantial proportion of the Victorian sheep industry, with numbers fluctuating from a stable base of 3.5 million to a high of 4.5 million in times of good seasons and favourable markets. Some 60% to 70% of the sheep population are concentrated in the more favourable grazing areas to the south, where fine and medium wool is produced from self-replacing merino flocks (1).

This paper concentrates on trends in the field crop and pastoral industries in the northern and central Wimmera, and concentrates on how these may affect the long term stability and sustainability of farming systems there.

Analysis

The Wimmera has a mediterranean type climate with an average annual rainfall of 350 mm (north) to 550 mm (south). The main soil types are grey and brown self-mulching clays (342,000 ha, 30%), hard alkaline pedal red duplex soils (182,400 ha, 16%), brown and grey-brown calcareous earths (68,400 ha, 6%), hard pedal mottled-yellow duplex soils (114,000 ha, 10%), sandy neutral and alkaline pedal mottled yellow duplex soils (102,600 ha, 9%), bleached sands with a coloured B horizon (102,600 ha, 9%), with other types making up the remainder (228,000 ha, 20%). The gradational clays (Ug 5) occur mainly in the central Wimmera region, and during the period 1951-1985, some 140,000 ha was sown annually to wheat there with production oscillating around 300,000 tonnes with average regional yields between 1.5 and 3 Oa. In the western area the principal soils are duplex (Dy 5.42) with sandy, neutral topsoils overlying a yellow mottled clay, handsetting loam^{y} (Dr 2) with red clay subsoil, bleached A2, and alkaline and an area of calcareous loamy earth (Gc 1.11 and Gc 1.12). Some 5 to 6,000 ha are sown annually to wheat with production oscillating around 10,000 tonnes with yields between 1.5 and 2.5 t/ha. In the eastern Wimmera principal soils are hard setting loam^{y} with yellow red clay subsoil (Dy 3, Dr 2), bleached A2 and alkaline. Some 4 to 6,000 ha are sown to wheat annually with production varying between 5 and 12,000 tonnes and yields between 1.2 and 2.3 t/ha.

The Wimmera and adjacent Mallee regions dominate field crop production in Victoria and in 1988/89, 75% of the land sown to cereals for grain production occurred in these two zones (Fig. 1). Similarly, of Victoria's grain legume area, in 1988/89 (281,000 ha), 81% occurred in these two regions (146,000 ha in the Wimmera and 81,000 ha in the Mallee) (Fig. 2).

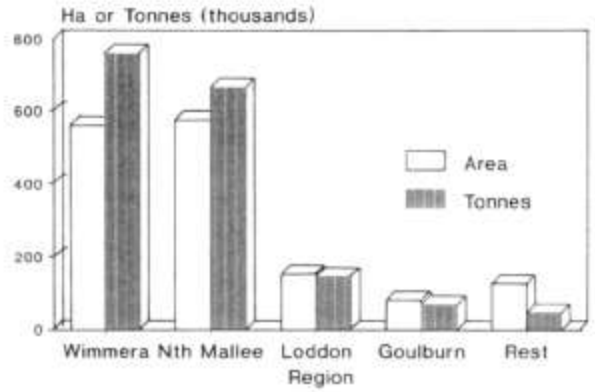

Figure 1. Area and production of wheat in Victoria 1988-89.

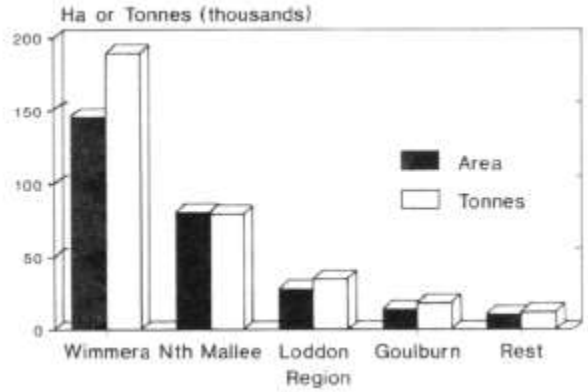

Figure 2. Area and production of grain legumes in Victoria 1988-89.

Trends in farming practice

Crops. The practice of long fallowing (September-May) allowed consistent cereal production in the period from 1910-40, particularly on the grey clay soils, although yields decreased as fertility fell. The introduction of pasture legumes in the 1940s particularly annual medics, saw the development of a pasture-fallow-wheat rotation which dominated until the late 1960s (2).

Widespread adoption of herbicides, relatively poor returns from livestock on medic pastures and the advent of grain legumes (field peas, chickpeas and faba beans) as an alternative to medic pasture led to the development of increasingly complex, opportunistic, continuous cropping sequences throughout the 1970s and 1980s.

The area sown to grain legumes has increased from less than 200 ha in 1970-71 to 146,000 ha in 1988-89 (Fig. 3), most of which was field peas.

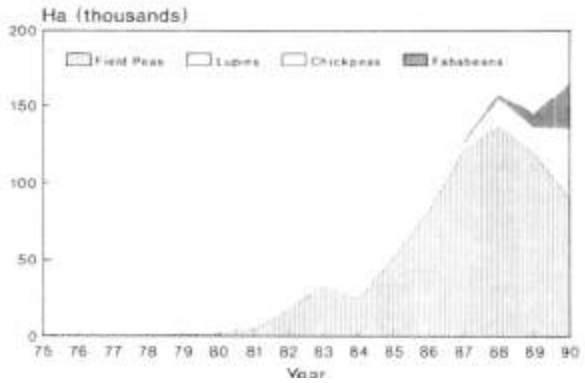

Figure 3. Area sown to field peas, chickpeas, lupins and faba beans, in the Wimmera 1975-90.

In recent times, there has been a dramatic expansion in the area sown to chickpeas and faba beans as shown below, at least part of this has occurred at the expense of the area sown to peas (Table 1).

Table 1. Area (thousand ha) sown to chickpeas, peas and faba beans, Wimmera region.

	1987	1988	1989	1990
Chickpeas	9	9	10	35*
Peas	120	137	119	90
Faba beans	3	9	30	30*
TOTAL	132	155	159	155

* Estimates

Sheep. Examination of regional statistics and unpublished surveys by extension officers indicate that opportunistic all-wether enterprises now dominate livestock production in northern areas once renowned for producing prime first and second cross lambs. This substitution of dry sheep for breeding ewes has occurred as several factors combined to reduce the performance of annual medic based pastures. Seed reserves of the medics fall to very low levels if more than three crops are grown in succession, and there has been widespread adoption of more intensive cropping practices during the last two decades. Aphids further reduced the productivity of medics during the late 1970s as no resistant cultivars were available at that time. The 1982 drought also saw many producers reduce their sheep enterprise. While lucerne based pastures are known to substantially increase productivity (3), they have been viewed as too difficult to integrate into cropping rotations, and grazing management must also undergo significant changes.

The area (thousand ha) of crops sown in the Wimmera in 1990 has been estimated as follows:

wheat	450	barley	180
oats	43	peas	90
chickpeas	35	rapeseed	12
safflower	10	lupins	8
faba beans	30		

Overall the ratio of cereals to break crops is now 3.6:1.

Discussion

Grain legumes add little if any nitrogen to total reserves in the soil (4) and it is therefore likely that nitrogen levels are declining in intensive cropping sequences. This occurs because most of the nitrogen

fixed by grain legumes is exported in the grain. Significant increases to soil nitrogen levels occur with legume based pasture because much smaller amounts of nitrogen are exported in livestock products while fixation is similar or better. It is also apparent that continuous cropping can only be supported on the best soil type (the grey self-mulching clay) and that land degradation is increasing on the other soils *as* shown by increasing erosion and surface structure problems (5). There is evidence from analysis of regional yields and protein trends that soil fertility is now restricting cereal crop productivity (6) particularly in above average seasons. A high priority for future work therefore is the development of a livestock enterprise which is economically competitive with field crop production as this will allow soil fertility levels to be increased. Initial work indicates that livestock production from lucerne based pastures is up to 60% greater than that achieved on annual medic based ones (7).

It has also become apparent that there is considerable variation within the clay (Ug) soil type and that management systems which address this, need to be developed. Preliminary findings show considerable differences in productivity and properties for two variants of the gradational clay soil type which might not be immediately apparent simply based on their different classifications (8). It appears that the problem clay soil types are more important in the Wimmera than the red duplex soils, and have not received adequate attention in the past.

References

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