IMPROVED SEASONAL FORECASTS FOR WOOL PRODUCERS IN WESTERN NSW

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INTRODUCTION

Western NSW, like the rest of the Australian pastoral zone, has experienced well documented land degradation associated with droughts (1879-1902, 1943-1945, 1960-1964 and 1982) (McKeon *et al.*, 2000). This degradation has taken the form of soil erosion, reduction of perennial forages and subsequent increase of woody species. Furthermore, the region is characterised by non-seasonal rainfall. This lack of strong rainfall seasonality creates difficulties in matching stocking rates with available forage. It also presents an opportunity for climate science to provide useful aids to management decision making, thus contributing to the financial and ecological sustainability of wool producers.

METHODS

We evaluated the skill of Seasonal Climate Forecasts (SCFs) in seven sub-regions of western NSW (Figure 1) to assess their potential to assist decision making by rangeland pastoralists. The probability of exceeding median (quarterly) rainfall or median (quarterly) pasture growth for various combinations of lead time (gap in months between the end of the period over which the indicator is measured and the start of the forecast period), forecast period (the time over which rainfall or pasture growth is forecast) and starting time (beginning of each month) was determined for both the Southern Oscillation Index (SOI) and Sea Surface Temperature (SST) phase systems. Both rainfall and pasture growth were computed for 5 x 5 km grid cells. Within each cell, skill was estimated by non-randomness in the distribution of above-median years across the SOI or SST phases, as measured by the chi-square (X^2) statistic. Forecasts were considered to have *useful* skill only if the probability of chi-square was <0.05 over at least 80% of the sub-region.

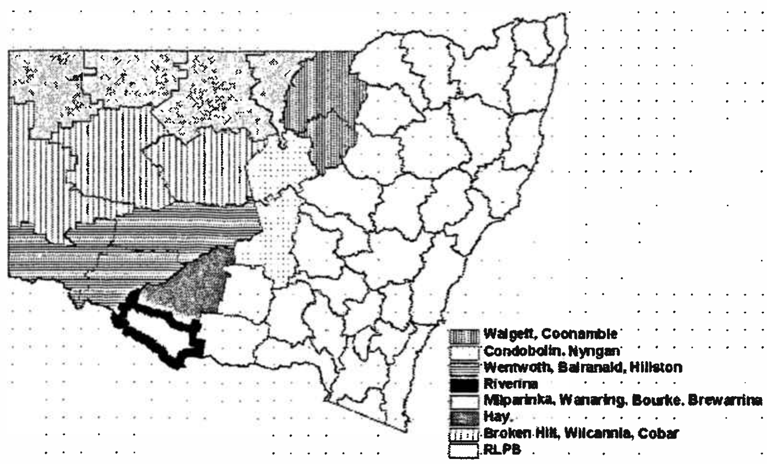

Figure 1. The project area subdivided into seven regions. Internal boundaries are Rural Lands Protection Board districts.

RESULTS

Only the SOI phase system had useful skill for any of the sub-regions, as assessed by our criteria. Within this system, forecasts related to pasture growth exhibited more skill than those related to rainfall, probably due to the integration of daily rainfall, temperature and evaporation in simulated pasture growth. The results of the skill analysis for the SOI phase system are presented in Figure 2 (a-c). Skill was higher in winter and spring than in summer and autumn, consistent with the timing of ENSO effects on rainfall in eastern Australia. Most regions exhibited useful skill (again by our criteria) for 0 and 1 month lead times in winter and spring but only two regions (Walgett/Coonamble and Condobolin/Nyngan) met the criteria for a three month lead time.

(a)

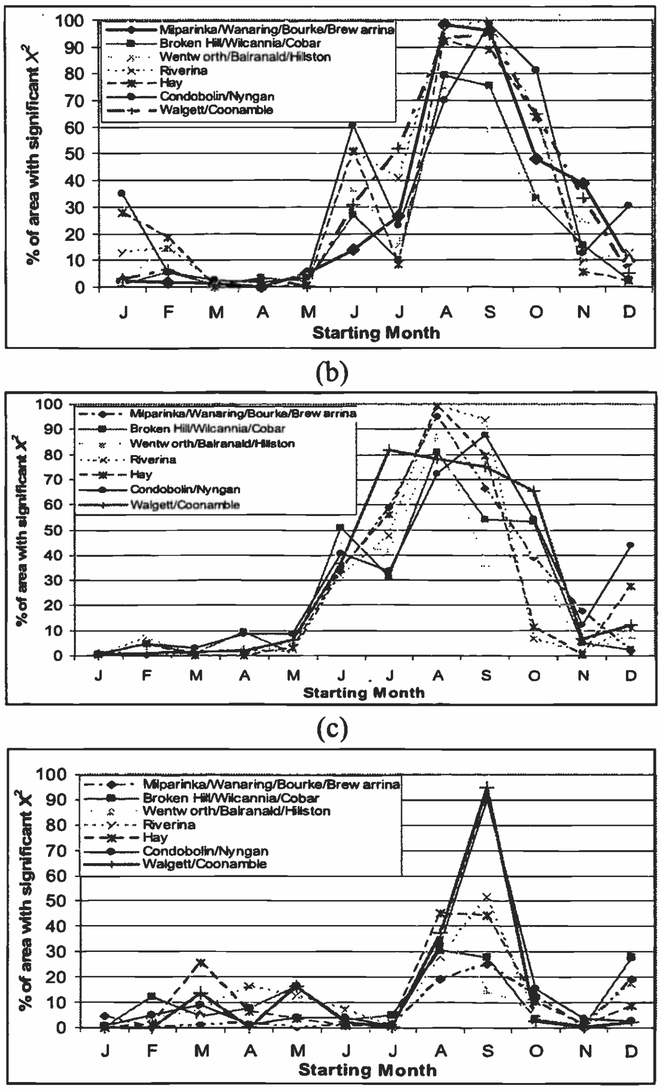

Figure 2. Skill of SOI-phase system in forecasting quarterly pasture growth in the seven regions of the project area. Skill is measured by the percent of area with significant X^2 values. (a) 0 month lead time (b) 1 month lead time and (c) 3 months lead time.

Monitoring of the SOI phase in winter and spring can assist management decision-making but its value is reduced during the more critical summer and autumn periods.

REFERENCES

McKeon, G., Ash, A., Hall, W. and Stafford Smith, D.M. (2000). Simulation of grazing strategies for beef production in north-east Queensland. *In* 'Applications of Seasonal Climate Forecasting in Agricultural and Natural Ecosystems, The Australian Experience'. (Eds G.L. Hammer, N. Nicholls and C. Mitchell). Kluwer Academic Publishers, Dordrecht. pp. 227-252.