Times are tough - should I be using superphosphate?

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Superphosphate can be used to increase fine wool production from native grass-based pastures, provided there is a legume present to respond to the superphosphate and provide nitrogen for the grass. However, the investment in fertiliser will only be profitable if stocking rate is increased sufficiently to utilise the extra pasture that is grown, and to ensure that fibre diameter is not increased. Estimating the number of extra stock that will need to be carried, or the financial and production risks that might be associated with pasture improvement is difficult. A new computer-based, decision support tool (*GrassGro*) can be used to explore these issues.

Methods

An unfertilised native grass pasture (*Microlaena stipoides* and *Danthonia* spp. with annual grasses and annual legumes) which originally carried 6 Merino wethers/ha, was fertilised annually with 125 kg superphosphate/ha, as described by Graham and Hazell (this volume). In the computer model, the weather data drive pasture growth given the specified soil conditions. Animals consume the pasture according to their breed characteristics, the stocking rate and the management rules that have been specified. Daily weather data for Yass (1984-96) were used, together with data for the soil profile at the Bookham site, its depth and waterholding capacity.

The pasture simulation in this case was based on annual grass and clover, and wethers were run with a 20% annual replacement policy. Current prices (Feb. 1999) were used to calculate gross margins. A fixed cost allowance ($90/ha) is based on local data. 12-year simulations were run for stocking rates from 4-19 wethers/ha.

Results

GrassGro predicted that if the fertilised pasture were stocked at 10-14 wethers/ha, reasonable gross margins could be achieved without incurring excessively large year-to-year swings in income (Figure 1). At higher stocking rates, predicted requirements for supplementary feeding increased dramatically. At lower stocking rates, profits were foregone because pasture was wasted.

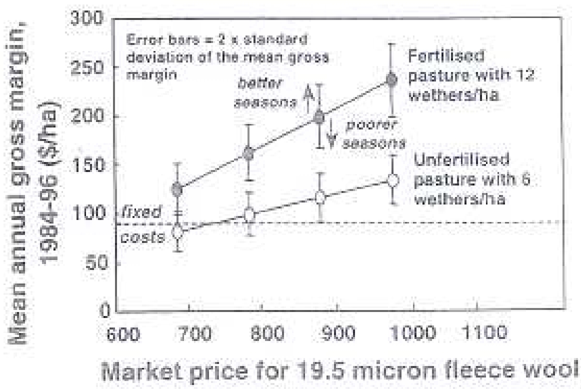

Figure 1. Comparison of gross margins from native grass-based pastures either unfertilised or fertilised with 125 kg superphosphate/ha/year and stocked at appropriate rates. Data obtained from simulations using GrassGro.

The original, lower fertility pasture system was also simulated using ***GrassGro*** by 'reducing' the soil fertility and stocking this pasture with 6 wethers/ha. A similar cost for supplementary feeding was incurred over the 12-year period (supplements were only fed in poorer years) and there were no fertiliser or extra stock costs. However, this system was predicted to be less profitable than the fertilised pasture system (Figure 1).

Conclusions

The computer model predicted that the fertilised pasture system is more likely to cover fixed costs and return a profit, irrespective of wool price fluctuations. It also has some investment flexibility, because there is scope with the extra production to employ price-risk management options (*e.g.* wool futures). When wool prices are extremely low, it may be possible to skip a fertiliser application and draw briefly on prior investments in soil fertility.