

Assessing fertiliser options as prices increase

Although phosphorus fertilisers are recognised for their positive effects on pasture production, recent increases in fertiliser price have generated considerable debate as to whether applying phosphorus fertilisers remains financially beneficial.

GrassGro is a powerful tool which can be used to examine this issue. As an example, we used GrassGro to assess how changes in fertiliser price affect optimum levels of maintenance fertiliser application for sheep grazing systems. GrassGro was used to model 3 enterprise types (Merino wethers, self-replacing Merino ewes, cross-bred ewes) at two locations (Hamilton VIC and Bookham NSW). Data from fertiliser trials at both Hamilton and Bookham were used to validate the simulations in GrassGro. Superphosphate prices examined were historic (\$250/t), current (\$540/t), and two higher levels (\$750/t & \$1000/t).

Optimum fertiliser application rates did not change markedly as fertiliser price increased, even up to very high fertiliser costs (Fig. 1). This result was consistent for all three enterprises examined at both Bookham and Hamilton.

Increases in fertiliser price decreased the range of fertiliser application rates and stocking rates that were financially viable in the long term (Fig. 2). None of the enterprise types assessed at Bookham or Hamilton were financially viable without some fertiliser input. In addition, conservative stocking rates became less financially viable as fertiliser price increased, because greater income is required to cover the higher input costs.

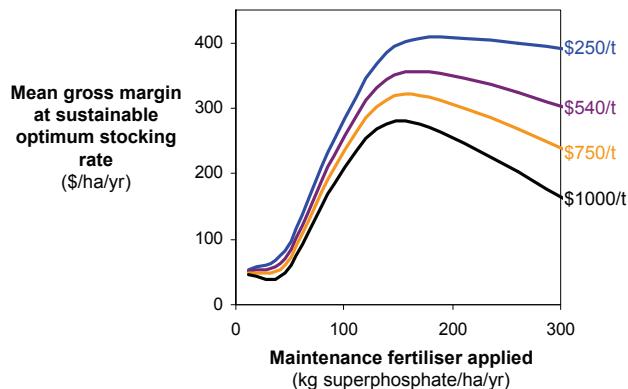


Figure 1. Mean gross margins at the sustainable optimum stocking rate at different levels of maintenance fertiliser for Merino wethers at Hamilton. Lines shown are for different fertiliser prices.

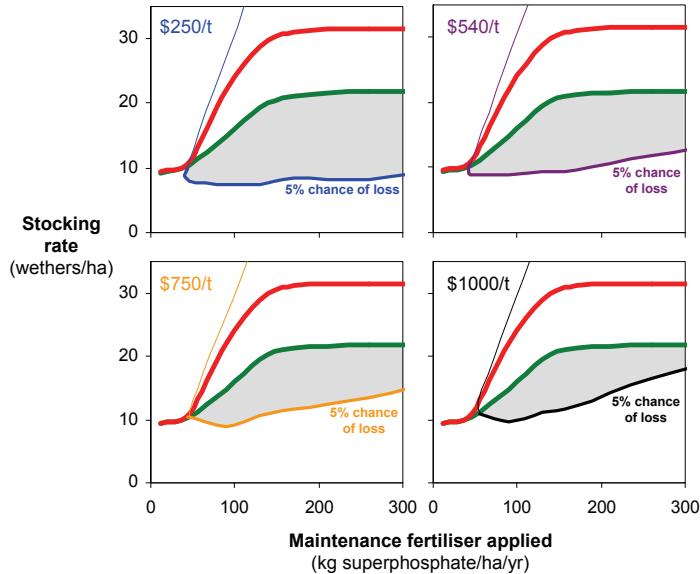


Figure 2. The financially optimum stocking rate (red line), the maximum sustainable stocking rate (green line), and the stocking rate below which there is >5% chance of long term financial losses (labelled) as fertiliser application rate increases, for wethers at Hamilton. Each panel shows a different fertiliser price. For example, at \$250/t, stocking rates below the solid blue line are financially unviable in the long term (understocked). Stocking rates above the green line are environmentally unviable in the long term, due to erosion risk and/or pasture degradation from over-stocking. The grey area represents the combinations of stocking rate and fertiliser application rate which are both financially viable and sustainable.

Applying GrassGro

GrassGro can be readily applied to assess the effects of fertiliser price on key management decisions and enterprise profitability by altering annual pasture costs. To receive guidance on applying a similar GrassGro analysis to a different locality, or to see the full report from our analysis, email: Karel.Mokany@csiro.au or phone: (02) 6246 5417.

In our analysis, financially optimum stocking rates were determined by applying a simple cash flow analysis to the annual gross margin data for each year simulated in GrassGro (1966-2007). We also used a randomised cash flow analysis to determine the probability of making a financial loss over the long term at each fertiliser rate ~ stocking rate.

In addition, we applied a sustainability criterion to limit stocking rates below levels that are likely to cause serious erosion events (i.e. total pasture mass must be more than 800 kg/ha for 8/10 years to be considered sustainable).