

Sensitivity analysis of a growth simulation for finishing lambs

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Introduction A stochastic lamb growth simulation model with a set of heuristic rules has been developed to evaluate management strategies for a solely pastoral grazing system in New Zealand (Morel *et al.*, 2005). In the present paper the results of a sensitivity analysis for this model are presented.

Method In the sensitivity analysis, only one parameter was changed at a time and the others were kept at their default values. For each parameter combination, the farm gross margin (\$/yr per ha) for a one-year period (FGM= returns from lamb sales minus the costs of lamb purchases and of pasture consumed) was calculated 1000 times for a 100 ha farm. The parameters investigated (default value) were: lamb buying price (220c/kg live weight); selling price (450 c/kg carcass weight); pasture cost (11c/kg dry matter (DM)); annual pasture production (10,956 kg DM/ha), initial pasture cover (1,500 kg DM/ha), minimal pasture cover (1,200 kg DM/ha) and initial stocking rate (15 lambs/ha).

Results The gross margin per ha (FGM) with default values was \$856.7 \pm \$13.36 (mean \pm SD). The relationship between initial stocking rate and FGM was curvilinear, with FGM increasing from \$826.6 to \$856.7 as stocking rate increased from 12 to 15 lambs/ha and then decreasing to \$825.3 for 18 lambs/ha. The changes in FGM (\pm SD) with changes in each of six parameters from the defaults values are presented in Figure 1. Changes in financial parameters had a greater impact on FGM than changes in pasture parameters. A 1% change in lamb buying price, selling price, or pasture cost were equivalent to \pm \$51.4, \pm \$71.5 and \pm \$11.4 changes in FGM, respectively.

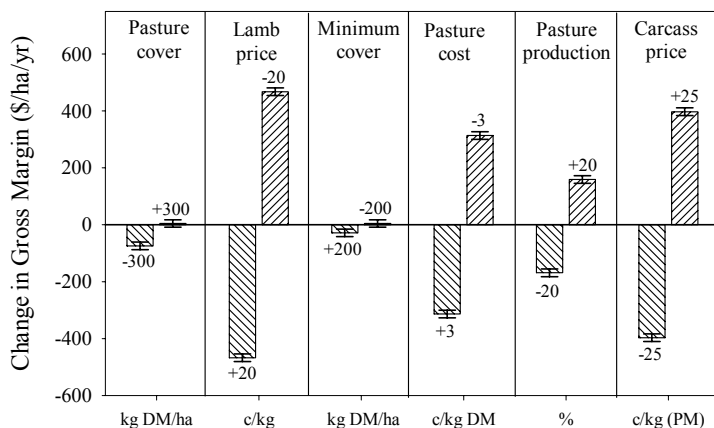


Figure 1 Changes in the gross margin per hectare with changes in each of six parameters with standard deviation bars for the default situation based on 1000 runs

A 1% increase (decrease) in initial pasture cover, minimum cover or total pasture production were equivalent to \$0.22 (-\$3.7), -\$1.72 (\$0.26) and +\$8.4 (-\$8.0), changes in FGM, respectively. The FGM decreased by \$30.76 for each percentage point decrease in feed allowance from a default value of *ad lib* feeding.

Conclusions It is concluded that this model provides an efficient means of evaluating the relative importance of a number of changes to a system of lamb meat production on pasture.

Reference

Morel, P.C.H., B. Wildbore, I.M. Brookes, P.R. Kenyon, R.W. Purchas & S. Ramaswami (2005). A growth simulation model for finishing lambs in a pastoral system. *Proceeding of the XX Grassland Congress*.