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A CASE FARM STUDY OF HIGH AND LOW  
SHEEP PERFORMANCE ON SOUTHERN  
NORTH ISLAND HILL COUNTRY.

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ABSTRACT

Two areas of research are reported in this study. First, the comparison between the profitability of a high performance flock and a low performance flock run at a higher stocking rate on Massey University's Tuapaka hill country unit. Second, the comparison between simple feed budgeting and complex simulation modelling as methodologies used in the design of pastoral based systems.

While the higher performance flock is found to be marginally more profitable than the lower performance flock, the simple (spreadsheet based) feed budget models used for the analysis show little difference in the pattern of feed demand between the flocks. The greatest differences in profitability were due to stocking rate rather than performance. A low stocking rate system that allowed lambs to be grown out to heavy carcass weights was found to be the most profitable system for Tuapaka. A number of weaknesses can be identified in the simple feed budgeting approach however.

These include: limited feed table data on the effects of different levels of nutrition on animal performance for the periods of pregnancy and lactation; a lack of feed table data on the relationship between feed intake and wool production, and failure to take into account the interaction between pasture cover, pasture growth rates, pasture quality, animal intake and subsequent levels of animal performance. These latter two weaknesses are analysed by using spreadsheet based simulation models in the second part of the study.

The results of these analysis indicate that wool production is under-estimated by the simple feed budget model, particularly in the case of the high performance flock. Correcting this increases the profit margin between the two flocks, but does not alter the rankings.

Analysis of the effect of interactions between pasture components and animal performance over the period of lactation shows that the simple feed budget approach fails to represent the true situation in terms of the pattern of pasture growth, animal intakes and subsequent performance levels, and that this is especially so where pasture cover falls below 1000 kg DM/HA. This analysis suggests that the linear relationships assumed in the simple feed budget approach do not hold in reality.

The conclusions from this study are that a high performance, low stocking rate system would be more profitable than a low performance, high stocking rate system for the Tuapaka hill country unit, but that it would offer little advantage in terms of better matching feed demand and feed supply.

(iii)

Complex simulation modelling has a number of advantages over the simple feed budgeting technique. However, the use of these models is dependent on the validation of the models and the construction of models that are "user-friendly". The study identified a number of areas where further work is required in the validation of some of the more complex inter-relationships.

Simple feed budgeting is quick and simple to use, and in a gross sense provides feasible results provided pasture cover levels are maintained within certain bounds. The definition of the upper and lower bounds requires further work, a review of the literature suggests they are 1000 and 1700 kg DM/HA.

The use of spreadsheet technology proved highly effective for the development of simple feed budget models. However, there were a number of constraints evident when spreadsheets were used for the construction of more complex models. These included, capacity, calculation time and limitations in terms of the availability of mathematical formulae. With further developments in this technology expected, spreadsheets should prove a useful tool in the development of more complex simulation models.

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