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**SHORT NOTE [NOTA CORTA]**

# MEETING THE CHALLENGE OF ESTABLISHING COMMERCIAL MOHAIR ENTERPRISES BY BUILDING AN INTERACTIVE ENTERPRISE MANAGEMENT AND FINANCIAL MODEL

# [ENFRENTANDO EL RETO DE ESTABLECER EMPRESAS COMERCIALES DE MOHAIR MEDIANTE LA CONTRUCCIÓN DE UN MANEJO EMPRESARIAL INTERACTIVO Y MODELO FINANCIERO]

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## SUMMARY

To assist in attracting investors into mohair production in Australia, a production and financial model was built as a learning and support tool. The work aimed to reduce search time and thinking costs about the impact of management strategies on financial feasibility. Various management strategies and assumptions applied to a case study with 300 breeding Angora does and eight variations. The results showed an internal rate of return for mohair ranging from 9.3% to 21.2% over 12 years, a median gross margin per effective hectare ranging from $82 to $167, cash at bank in year 12 ranging from $8,700 to $56,800 and net enterprise assets ranging from $69,900 to $155,700. A key benefit of the model was its ability to allow new farmers to explore potential management strategies and their assumptions about a future enterprise before investing.

**Key words:** *Investment; Financial return; Modelling; Gross margin; Net present value; Decision-making; Management*

## INTRODUCTION

Both, business modelling and benchmarking have been identified as critical elements in expanding mohair production in Australia (Chaffey and McGregor, 2004). Magretta (2002) identified that a business model is a mix between a story that explains how things will work and the numbers that support it i.e. linking narrative to numbers. When used correctly a business model enables people to think rigorously about how a business will work, what it might achieve and why. Business models describe a system and how things fit together to produce outputs.

To reduce search costs, thinking costs and time obsolescence costs many potential investors to an industry attend industry conferences in conjunction with agricultural extension activities. However industry conferences are few and often distant in time and are not the preferred method potential commercial investors would use to assist their diversification decision making about an Angora goat enterprise. In addition, traditional extension methods are either non-existent in new industries, or have given way to private consulting (Chaffey and McGregor, 2004).

Chaffey and McGregor (2004) found that Australian commercial farmers unrelated to the mohair industry considered it difficult to assess the financial feasibility of an Angora goat mohair enterprise over a number of years. They were unsure where they would get credible information. They indicated they would consult with other growers they respected, their adviser or the Department of Agriculture about the financial feasibility of the enterprise. They identified the need for better use of historic information such as average fleece prices, the use of software packages, extended periods of financial analysis over a numbers of years and being able to run sensitivity analyses. Gross margins were often mentioned but some regarded them as not sufficient. Some farmers wanted to review cash flow over a number of years and measure the return on investment. Many would want to use computer software to do their analysis.

In the absence of a suitable computer model, the objective of this work was to build, operate and transfer a learning support tool for the mohair enterprise in Australia that reduces search time and thinking costs about management strategies and financial feasibility for potential investors in the mohair industry.

## MATERIALS AND METHODS

Relevant industry physical and financial data that described the structure, trends and events important to the mohair enterprise were collated (Davies and Murray, 1997; McGregor, 1997, McGregor and Butler, 2004). The computer model was built using iThink® software (iseesystems Inc., Lebanon, New Hampshire, USA). This software separates formulae from model structure and the user interface. It is highly suited to simulation and has a superior communication interface compared with spreadsheets such as Microsoft Excel®. The model has the ability to feed data into Microsoft Excel® for further analysis and presentation. Further details are provided elsewhere (Chaffey, 2006).

The central feature of the model was the herd population structure that allows population changes over time based on the parameters set by the user. Animals are weaned, they age, die, are bought and sold, and as animals age, the volume and quality of mohair produced changes. Changes in mohair quality resulted in changes in relative market value of mohair. The model runs over a 12-year time frame with annual increments. This allows the user to think about how they might manage the enterprise over multiple years and what performance might be possible when adopting one management strategy versus another under a given set of assumptions.

A case study example was used to examine the position of a new farmer whose initial strategic goal was: to invest in a self-replacing 300 breeding doe Angora goat enterprise retaining wethers (castrated males) to 48 months of age with the main income streams being the sale of live animals to abattoirs and mohair. A range of assumptions support this strategic goal. This model was chosen as experience has shown it is the most likely model to be initially adopted by farmers interested in larger scale mohair enterprises. The model was used to test performance of the mohair enterprise under different management and market assumptions. The following tests are representative examples:

Test 2: The breeding herd size increased to 500 does, other variables unchanged.

Test 3: Using Test 2, wethers sold after 4th shearing at 2 years.

Test 4: Using Test 1, increase the quantity of mohair produced by 1% per year from the 2nd year to achieve a 12% improvement in mohair production by the 12th year.

Test 5: Using Test 4, increase the quality of mohair shorn in the third, fourth and fifth shearings. Assume a 3% increase in higher value mohair grades and a 3% decrease in mohair of lower value.

Test 6: Using Test 5, increase the price of all mohair by 1% per year for 12 years.

Test 7: Using Test 6, assume inflation of prices of 3% per annum over the 12-year period.

Test 8: Using Test 7, increase weaning rate by 1 kid per 100 does per annum from 80 kids per 100 does in year 1 to 92 kids per 100 does by year 12.

## RESULTS

The results for the initial strategic goal (Test 1) and the test cases under various management and market assumptions are summarised in Table 1. The performance of the initial strategic enterprise changes over time. The analysis suggests a new mohair farmer will benefit from a 5 to 8 year strategic plan to optimise the performance of the enterprise. For example, the average gross margin per effective hectare exceeds $150 per ha only after year 8 (Figure 1a). The average total enterprise cash flow becomes positive after the 4$^{th}$ year and approaches its maximum by the 8$^{th}$ year (Figure 1b).

The average net present value reaches zero in the 11$^{th}$ year (Figure 1c). Alternatively the average discount payback period takes 11 years using a required rate of return on investment of 10%. The average production of mohair across all eight tests exceeds 4,000 kilograms in year 7 and the standard deviation of production exceeds 500 kilograms after year 7.

## DISCUSSION

Decisions made early in the establishment of an enterprise can have significant effects on the return on investment. They can also have significant effects on delivery of mohair to supply chains. For example, if the base case strategy and assumptions were adopted (Test 1) the business would have returned an 11.5% internal rate of return and 35,800 kg of mohair with a farm gate value of $330,000 over 12 years of operation. If ten new farmers to the industry adopted the same strategies and assumptions based on Test 1 then they would contribute 358 tonne of mohair to the supply chain in the same time frame with a farm gate value of $3.3 million.

However, if the ten new farmers were able to make small improvements on key drivers of enterprise performance, the internal rate of return could move to 17.5%, a 52% increase (Test 5). They would also contribute an extra 24,770 kg of mohair to supply chains over 12 years, an increase in total farm gate value of mohair of $305,000.

Management decisions have a significant impact on the financial performance of the Angora enterprise as illustrated by the eight test cases provided in Table 1. The tests illustrate the way the model can be given practical application that inform management decision-making and lead to further enquiry and/or better enterprise outcomes.

There are many more tests that could be applied to the enterprise. For example; what would be the effect of reaching the desired breeding herd size faster either through increased weaning rates (that may require an increased labour input to the enterprise in the first five years) or through purchasing more stock to build the herd up faster (which raises the issue of where larger numbers of genetically acceptable stock may be found)? People experienced in the industry would apply further rigorous testing, questioning and examination of causal effects with the outcome being better decision making. The model has been tested with farmers and they have been pleased with the outputs. Such a model does test the financial competency of farmers and guided use and appropriate support for using this model is essential if adoption and improved farm business outcomes are to be achieved in practice.

## CONCLUSION

Financial and production modelling of the mohair enterprise has enabled complex management, financial and time related events to be packaged for easier understanding by potential investors. The format enables easy testing of variables. Outputs are suitable for inclusion in business plans for presentation to financial institutions.

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Table 1. Enterprise financial performance for the initial strategic goal (Test 1) and other test cases based on various management and market conditions (see text for details). Values in Australian Dollars. Mohair cut per head is for each shearing every six months.

| Test | Internal rate of return % | Median gross margin $/Ha | Median mohair produced (kg/yr) | Median mohair cut per head (kg) | Median mohair price aid ($/kg) | Net present value $ | Cash at bank $ | Net enterprise assets $ |
|---|---|---|---|---|---|---|---|---|
| 1 | 11.5 | 114 | 3,606 | 2.5 | 9.17 | 1,650 | 15,699 | 69,968 |
| 2 | 13.7 | 102 | 4,780 | 2.4 | 9.48 | 5,806 | 28,844 | 111,613 |
| 3 | 10.0 | 82 | 3,833 | 2.3 | 10.79 | -329 | 12,682 | 87,357 |
| 4 | 15.8 | 135 | 3,813 | 2.6 | 9.17 | 8,369 | 32,661 | 88,917 |
| 5 | 17.5 | 144 | 3,813 | 2.6 | 9.38 | 11,091 | 39,148 | 95,862 |
| 6 | 21.2 | 167 | 3,813 | 2.6 | 10.10 | 18,151 | 56,802 | 115,731 |
| 7 | 9.3 | 116 | 3,813 | 2.6 | 10.10 | -1,179 | 8,700 | 78,027 |
| 8 | 13.1 | 112 | 4,061 | 2.6 | 10.22 | 4,131 | 22,528 | 99,206 |

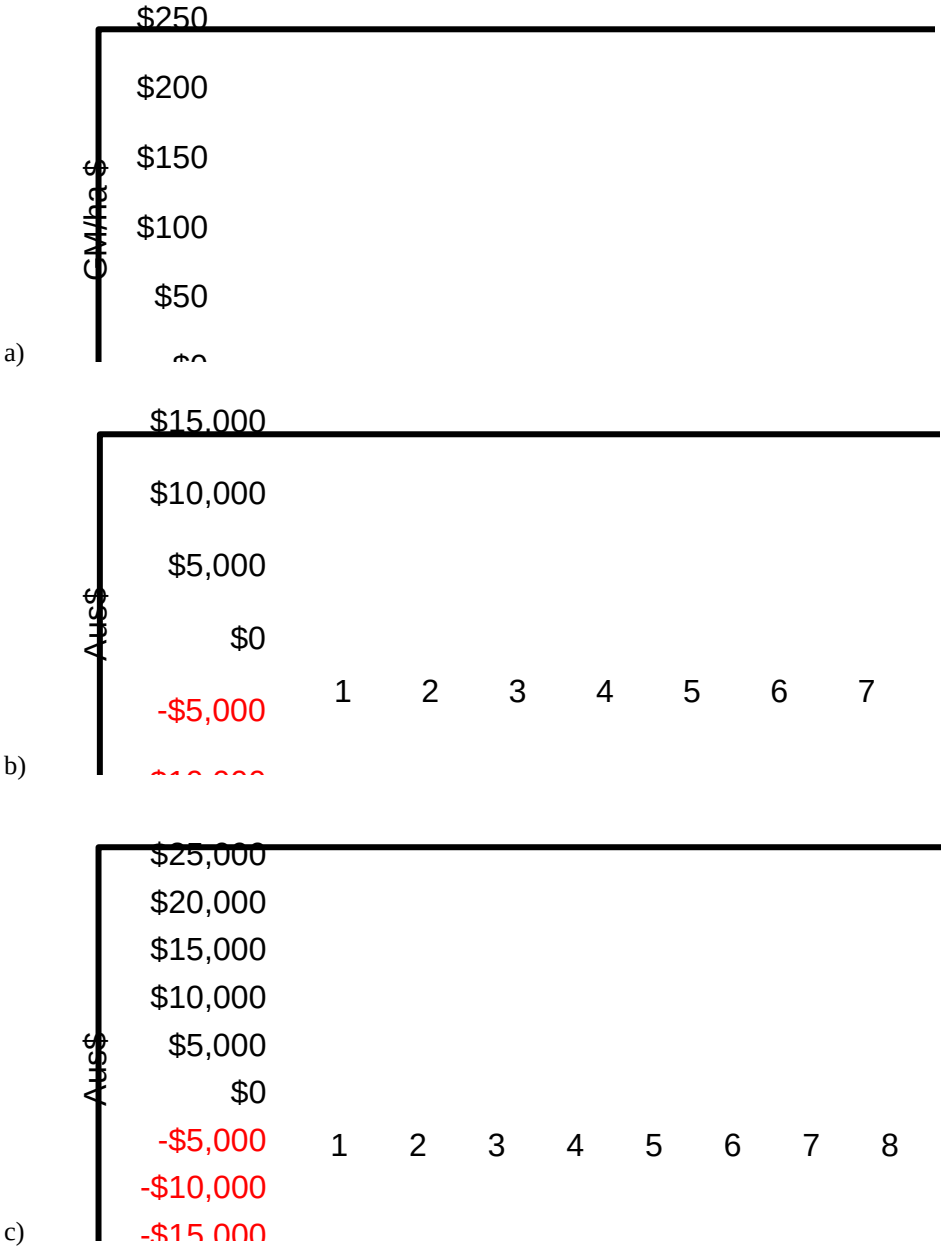


Figure 1. Change over time in the financial performance of Angora mohair enterprises: a) gross margin (GM) per effective hectare of farm; b) Total enterprise cash flow (total revenue less total costs less tax paid plus depreciation rebate less capital costs); c) Net present value and discounted payback period using a discount rate of 10%.
Symbols: ■ maximum value; ● mean value; ▲ minimum value.

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