Structuring flexible management to maintain profitable and sustainable lamb production systems

Warwick Badgery and Kim Broadfoot
Introduction

• EverGraze Key Messages
• Modelling approach
• Profitability of flexible systems
• Sustainability of flexible systems
• Summary
EverGraze experiment

• 3 grazing treatments:
  – Continuous grazing (1-paddock)
  – 4-paddock rotation
  – 20-paddock rotation

• Spring lambing (merino ewes x terminal sire) system

Hypothesis:
1) Higher intensity of grazing system will increase profitability and enhance NRM health
2) Landscape will greatly influence pasture productivity and NRM health

More details at: evergraze.com.au
EverGraze Key Messages

1. Landscape variability can be identified, mapped and managed
2. Composition of pastures with a high native perennial component is stable under managed grazing
   - Few differences in the composition of native perennial grass species between grazing systems
   - Minimum herbage mass (800 kg DM/ha) and ground cover (80%) targets were in place to prevent degradation
EverGraze Key Messages

3. The effect of grazing intensity on production and profit from native pasture systems
   - Higher pasture quality and individual animal performance with lower grazing intensity
   - Higher production per hectare with increased grazing intensity
Modelling

Questions addressed:
1. Are flexible stocking rate systems more profitable than rigid systems?
2. What are the best cues to make decisions about flexible management and at what stage of the production cycle/season should these decisions be made?
Modelling

- AusFarm® model used
- Pasture growth, ewe weights and lamb growth rates calibrated with data from the Orange EverGraze Proof Site
- The modelling examined:
  1. differences in ewe numbers (3, 4, 5.3, 7 ewes per ha) and lamb sale age (lambs sold at 81, 92, 112, 153 and 170 days old, plus a flexible sale time)
  2. options for varying ewe numbers prior to joining or at scanning in response to seasonal conditions
Profitability
• Overall, profitability was highest at 4 ewes per ha
Ewe numbers

Year

GM ($/ha)

Lambs sold at 112 days (22 Dec)
Flexible lamb sale was equally as profitable as later fixed sale dates (154 and 170 days)

Lambs sold at target weight of 40 kg or when weight gain was <100g/day

Lambing = 1 Sept
81d = 21 Nov
92d = 2 Dec
112d = 22 Dec
153d = 2 Feb
170d = 18 Feb

(AusFarm)
Lamb sale dates

At 4 ewes per ha
Varying ewe numbers

• Two decision points: pre-joining (1 Mar) and scanning (30 June)
• Decision based on:
  – green herbage mass (3, 6 and 12 month)
  – rolling average rainfall (3, 6 and 12 month)
  – temperature (Ave Tmax: Nov, Dec, Jan, Feb; pre-joining only)
Varying ewe numbers

- No significant difference between ewe adjustment policies
- Extremely high variability in gross margins
- Ewe adjustment policies are much more risky
- On average scanning (Ave $159/ha) is a better decision time than pre joining (Ave $147/ha)

(AusFarm)
Sustainability
Flexible management and ground cover

Autumn ground cover (AusFarm)
Flexible management and ground cover
Flexible management and ground cover

- Autumn ground cover decreased with increasing grazing pressure
- Earlier lamb sale time generally had slightly higher ground cover
- Overall ground cover was more influenced by ewe number than lamb sale date
- Found the same trend for dry matter (kg/ha)
Stocking rates

<table>
<thead>
<tr>
<th>Ewes (No./ha)</th>
<th>Lamb sale age (days)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>81</td>
<td>92</td>
<td>112</td>
<td>153</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4.8</td>
<td>4.9</td>
<td>5.1</td>
<td>5.6</td>
<td>5.7</td>
<td>5.2</td>
</tr>
<tr>
<td>4</td>
<td>6.2</td>
<td>6.4</td>
<td>6.6</td>
<td>7.1</td>
<td>7.3</td>
<td>6.7</td>
</tr>
<tr>
<td>5.3</td>
<td>7.9</td>
<td>8.0</td>
<td>7.5</td>
<td>8.8</td>
<td>8.9</td>
<td>8.2</td>
</tr>
<tr>
<td>7</td>
<td>9.8</td>
<td>9.9</td>
<td>10.2</td>
<td>10.6</td>
<td>10.8</td>
<td>10.3</td>
</tr>
<tr>
<td>Average</td>
<td>7.2</td>
<td>7.3</td>
<td>7.4</td>
<td>8.0</td>
<td>8.2</td>
<td></td>
</tr>
</tbody>
</table>

The average stocking rate (DSE/ha) for different ewe numbers and lamb sale ages
Flexible management and ground cover

<table>
<thead>
<tr>
<th>Ewe adjustment policy</th>
<th>Ground Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green DM - June</td>
<td>0.65&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td>Green DM - March</td>
<td>0.66&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td>Ave 12 M rain - June</td>
<td>0.69&lt;sub&gt;ab&lt;/sub&gt;</td>
</tr>
<tr>
<td>Ave 12 M rain - March</td>
<td>0.66&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td>Ave 6 M rain - June</td>
<td>0.67&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td>Ave 6 M rain - March</td>
<td>0.66&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td>Ave 3 M rain - June</td>
<td>0.68&lt;sub&gt;ab&lt;/sub&gt;</td>
</tr>
<tr>
<td>Ave 3 M rain - March</td>
<td>0.66&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td>Tmax Feb - March</td>
<td>0.65&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td>Tmax Jan - March</td>
<td>0.66&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td>Tmax Dec - March</td>
<td>0.66&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td>Tmax Nov - March</td>
<td>0.64&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td><strong>4 ewes</strong></td>
<td><strong>0.75&lt;sub&gt;b&lt;/sub&gt;</strong></td>
</tr>
</tbody>
</table>

Ground cover for the flexible policies to vary ewe numbers
Summary

• Flexible management options are better based on altering the sale time of lambs rather than altering ewe numbers.
• Moderate stocking rates (4 ewes/ha) with animal demands weighted towards spring and options to decrease stocking rate through late spring and summer if rainfall is inadequate were best.
• Autumn ground cover can be improved by lowering ewe numbers rather than selling lambs earlier.
• Needs to be examined for different pasture types, enterprises and environments.