Maximising beef production and profits using high quality forages
Poll

Are you?

• a beef producer using high quality sown forages
  ▪ for example, leucaena, butterfly pea, oats, forage sorghum, lablab etc.

• a beef producer not yet using high quality sown forages

• an industry representative
Poll

If currently using high quality sown forages, do you?

• grow annual forage crops only

• grow perennial legume forages only
  ▪ for example, leucaena, butterfly pea

• grow both types of forage
• DAF and MLA co-funded project: 2011 – 2015

• Objective:
  – to examine the relative production and profitability of alternative forage options for backgrounding and finishing cattle in the Fitzroy River catchment of Queensland
Data from co-operator properties

• 24 forage sites on 12 properties over 2011-2014
  – **annuals:** oats, forage sorghum, lablab
  – **perennials:** butterfly pea-grass, leucaena-grass, perennial grass-only as a comparison

• 3 regions within the Fitzroy River basin
  – CQ Open Downs, CQ Brigalow, SQ Brigalow
Data from co-operator properties

• monitored forage, animal and economic performance

• 31 individual data sets
Conclusions: forage production

### Annual forages

<table>
<thead>
<tr>
<th></th>
<th>Oats</th>
<th>Sorghum</th>
<th>Lablab</th>
<th>Leucaena-grass</th>
<th>Butterfly pea-grass</th>
<th>Perennial grass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass in grazed pdk (kg DM/ha)</td>
<td>4,555</td>
<td>12,150</td>
<td>6,014</td>
<td>L: 417</td>
<td>BP: 528</td>
<td>3,702</td>
</tr>
<tr>
<td>Total forage growth (kg DM/ha)</td>
<td>8,184</td>
<td>19,307</td>
<td>9,637</td>
<td>G: 3,809</td>
<td>G: 4,591</td>
<td>n/a</td>
</tr>
<tr>
<td>Diet CP (% DM)</td>
<td>12.3</td>
<td>8.8</td>
<td>11.5</td>
<td>12.0</td>
<td>9.7</td>
<td>6.6</td>
</tr>
<tr>
<td>Diet DMD (%)</td>
<td>63</td>
<td>55</td>
<td>59</td>
<td>59</td>
<td>59</td>
<td>55</td>
</tr>
</tbody>
</table>

Biomass values are the peak for annuals and average over the duration of monitoring for the perennials. Leucaena biomass is only the edible material (<5 mm in diameter).

- Greatest biomass: sorghum
- Highest quality: oats (C3)
- Lablab and leucaena-grass also provided high quality diet
Conclusions: forage production

- Generally soil fertility was low and fertiliser application was not common practice
  - soil N and P likely to be limiting for many annual forage crops
  - P limiting for many perennial legume-grass pastures
    - Low soil N levels were reflected in low plant CP for some cereal crops
    - most extreme example was SQB Oats 2011: soil nitrate N was 42 kg/ha; green leaf CP was 4.5% at start of grazing
**Conclusions: animal production**

- Sown high quality forages increase beef output
- Leucaena-grass beef production 2.6 times > than grass-only
- Forage sorghum: similar beef production to oats and lablab although twice as much forage biomass

<table>
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<th>Perennial forages</th>
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<tr>
<td></td>
<td>Oats</td>
<td>Sorghum</td>
</tr>
<tr>
<td>Total LWG (kg/ha/yr)</td>
<td>93</td>
<td>108</td>
</tr>
</tbody>
</table>

Total LWG values are per total grazing area in each paddock; range of values across all sites shown in brackets
Conclusions: animal production

- **Grazing management** may be limiting productivity and profitability of annuals, especially of forage sorghum
  - generally grazing started too late and stocking rates were too low
Conclusions: animal production

• Maximise profitability by selling cattle straight off forage
  ▪ cattle returned to perennial grass pastures will lose their liveweight advantage due to compensatory gain effects
  ▪ compensatory gain in such circumstances generally mean it is uneconomic to feed forages to growing stock

• Better monitoring of cattle weight gain may allow more optimal timing of sale and maximise cattle price margin
Questions, comments?

Type your questions here anytime
### Conclusions: gross margins

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<tr>
<td>Oats</td>
<td>Sorghum</td>
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<tr>
<td>Forage costs ($/ha/yr)</td>
<td>136 (93-193)</td>
</tr>
<tr>
<td>Gross margin ($/ha/yr)</td>
<td>131 (54-197)</td>
</tr>
</tbody>
</table>

Owner rates; forage costs per sown forage area only; gross margin per total grazing area
Conclusions: gross margins

- Profitability was the combined result of
  - forage and beef production (kg/ha)
  - forage costs ($/ha)
  - cattle price margin (sale less purchase price; $/kg LW)

influenced by management, seasonal and market factors
Prices and gross margins

- Gross margins were calculated on the basis of the market prices available when cattle were placed on the forage and removed from the forage.
- The variability in purchase and selling prices over the various grazing periods was reflected in the variability of the gross margins produced.
Paddock result vs. whole farm

- **Gross margins** are the **first step** in determining the effect of sown forages on farm profit
  - they show whether the forage activity makes a profit or loss, at the paddock level

- To determine the value of the sown forage system to the **whole farm** or business, a **more complete economic analysis** is required
Whole farm economic case studies

- **value** of the sown forage system to the ‘whole farm’ or business, relative to other alternatives, e.g. perennial grass or grain crop
- compare the **net profit** generated by alternative operating systems
- include changes in un-paid labour, herd structure and capital
Conclusions: whole farm case studies

• Perennial legume-grass pastures, particularly leucaena
  – currently have a significant economic advantage over
    ▪ annual forages, and
    ▪ perennial grass pastures
  – not as profitable as grain cropping where it is a feasible alternative

• Annual forage crops
  – generally only add value to the beef enterprise if the opportunity cost of plant and unpaid labour are excluded
Constructed scenarios

- modelled scenarios
- use long-term average seasonal conditions and market prices
- standard management practices
Constructed scenarios

• results generally corroborate those from co-operator sites
  – same average ranking of forages for gross margin
    ▪ except for perennial grass (6th for constructed scenarios but 4th for co-operator sites)
In summary, top tips....

To maximise **productivity and profitability** of sown forages:

- **Ask the right questions**
  - What is the purpose of the forage?
  - What forage types are best suited to my land type and production system?
  - What is the expected forage and cattle production?
  - What is the likelihood of the forage improving my business profitability?

- **Plan ahead**
- **Use best practice** agronomy and animal management
- **Collect data** and do the sums
Poll

Do the project results?

• confirm what you already thought/knew
• contrast with your own experience/figures
• unsure/need more information
Questions, comments?

Type your questions here anytime
Modelling and DST development

• Data from field sites used to evaluate forage and animal models

• Forage models
  – GRASP
    ▪ predicted un-grazed and grazed grass biomass satisfactorily
  – APSIM
    ▪ Satisfactory prediction of un-grazed oats biomass
    ▪ Under-predicted un-grazed forage sorghum and lablab biomass
    ▪ Effects of grazing on annual forage biomass was poorly predicted
Modelling and DST development

• Animal models
  – GrazFeed model under-predicted LWG of cattle grazing forage crops
  – Simple forage utilisation equation deemed most appropriate for use in simple DST

• Prototype DST, ‘ForageARM’ has been developed
  – Example of what might be possible if models can be improved
Extension products and activities

- Producer guide to forage use has been produced: ‘Feeding forages in the Fitzroy’
- Forage gross margin calculators/spreadsheets
- Fitzroy Basin Field days

You are invited to a...

High Output Forages Field Day
Forage sorghum, lablab, oats, leucaena & perennial pastures

<table>
<thead>
<tr>
<th>Locations</th>
<th>Dates</th>
<th>Times</th>
<th>Contact</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clermont</td>
<td>2nd June 2015</td>
<td>8:30am – 3pm</td>
<td>Jim Fletcher</td>
<td>(07) 4967 0731</td>
<td><a href="mailto:jim.fletcher@daf.qld.gov.au">jim.fletcher@daf.qld.gov.au</a></td>
</tr>
<tr>
<td>Moura</td>
<td>3rd June 2015</td>
<td>8:30am – 3pm</td>
<td>Byrony Daniels</td>
<td>(07) 4983 7467</td>
<td><a href="mailto:byrony.daniels@daf.qld.gov.au">byrony.daniels@daf.qld.gov.au</a></td>
</tr>
<tr>
<td>Taroom</td>
<td>4th June 2015</td>
<td>8:30am – 3pm</td>
<td>Tim Emery</td>
<td>(07) 4622 9903</td>
<td><a href="mailto:timothy.emery@daf.qld.gov.au">timothy.emery@daf.qld.gov.au</a></td>
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Acknowledgements

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• We gratefully acknowledge the valuable contributions and input provided by **beef producers** across the Fitzroy River catchment who allowed collection of data from their forage paddocks and who provided information about their business to allow development of farm economic case studies.

• **The DAF project team:**
  – Dr Maree Bowen, Stuart Buck, Fred Chudleigh, Kylie Hopkins, Debra Corbet, Tim Emery, Byrorny Daniels, Jyoteshna Owens, Jason Brider.
For more information...

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Email - maree.bowen@daf.qld.gov.au
Questions, comments?

Type your questions here anytime