Principles of Dairy Herd Management

Economic Evaluation

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Outline

120 minutes

Principles of dairy herd management
Economic decision-making

Understanding basic methodologies
Economic models, simulation, optimization

Applications
Practical usage

Demonstration
Existing applications
Dairy farm economic management

Principles of dairy farm management

Making and implementing decisions
Maximum (production) profit

Decisions at different levels
Different planning horizons
Cow, farm, region

Relies on agricultural economics
Subject to multiple restrictions

Integrates various disciplines
Biology, physiology, economics, crops, ...
Dairy farm economic management

Principles of dairy farm management

Farm is unit of concern

>13,000 kg/cow  Country Aire Farms

1,440 ha

850 heifers

1,800 cows

16 employees

Manure management

40-cow carousel parlor
Dairy farm economic management

Principles of dairy farm management

Wisconsin

11,000 dairy farms
Dairy farm economic management

Principles of dairy farm management

Dairy cow
A complex system

Wellbeing
Feed

Offspring
Milk
The dairy management cycle
Planning and analyzing outcomes
Enterprise budgets
Enterprises inside a dairy farm

- Heifers
  - Income
  - Expenses
- Cows
  - Income
  - Expenses
- Crops
  - Income
  - Expenses
- Biogas
  - Income
  - Expenses

Total gross margin
Total fixed costs
Net profit of a dairy farm
Partial budgeting
Effective when looking at one component

- Additional Returns
- Reduced Costs
- Returns Foregone
- Additional Costs
Cost-Benefit analysis
Useful for possible new investments

Costs & Benefits
Discount rate ($\beta$)

$PV = \frac{FV}{(1+\frac{\beta}{100})^n}$

Decision Criterion

NPV
C/B
IRR

Net present value
Cost-benefit
Internal rate of return
## Cost-Benefit analysis

### An example

<table>
<thead>
<tr>
<th>Year</th>
<th>Strategy A</th>
<th></th>
<th>Strategy B</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Costs</td>
<td>Benefits</td>
<td>Costs</td>
<td>Benefits</td>
</tr>
<tr>
<td>1</td>
<td>20</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>8</td>
<td>2</td>
<td>3</td>
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<td>3</td>
<td>7</td>
<td>14</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>23</td>
<td>6</td>
<td>14</td>
</tr>
</tbody>
</table>

### Present value

- PV
- NPV
- C/B
- IRR

\[ \beta = 5\% \]
Decision analysis
Include uncertainties

Mathematical techniques
Maximum (production) profit

Process diagrams
Maximum (production) profit

Payoff matrices
Maximum (production) profit

Decision trees
Maximum (production) profit
Mathematical techniques

Specific algorithms

\[ A_i = f(A_i, S_1 \ldots S_j, P_1 \ldots P_j, V_{i1} \ldots V_{ij}) \]

- \( A_i \) = Decision option \( A_i \) (action)
- \( S_j \) = State of nature
- \( P_j \) = Probability of occurrence \( S_j \)
- \( V_{ij} \) = Value option \( i \) for state \( j \)

\[ \text{Max EMV} (A_i) = \text{Max} \sum_j (P_j V_{ij}) \]

EMV = Expected monetary value

Maximum of weighted average of all probabilities of occurrence and their respective values
## Mathematical techniques

### An example

### Reproductive programs

<table>
<thead>
<tr>
<th>Programs</th>
<th>Outcomes</th>
<th>Probabilities</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>A₁ Current</td>
<td>![Cow icon]</td>
<td>0.16, 0.84</td>
<td>$631, $409</td>
</tr>
<tr>
<td>A₂ Alternative</td>
<td>![Cow icon]</td>
<td>0.25, 0.75</td>
<td></td>
</tr>
</tbody>
</table>

\[
EMV (A₁) = 0.16 \times $631 + 0.84 \times $409 = $444.5
\]

\[
EMV (A₂) = 0.25 \times $631 + 0.75 \times $409 = $464.5
\]

### Conclusion

Alternative program brings $20/cow extra net return

Giordano et al. (2011)
Payoff matrices
Tabular data representation

Decision actions
Multiple results

Probabilistic outcomes
Uncertain possibilities

<table>
<thead>
<tr>
<th>State of nature</th>
<th>Value of outcome</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>$S_j$</td>
<td>$A_{ij}$</td>
<td>$P_j$</td>
</tr>
</tbody>
</table>

Matrix:

- Top left: 1, 1
- Top right: 0, 0
- Bottom left: 0, 0
- Bottom right: 1, 1
Payoff matrices
An example

<table>
<thead>
<tr>
<th>Corn price ($/bu)</th>
<th>Milk price (cwt)</th>
<th>14</th>
<th>15</th>
<th>17</th>
<th>19</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1</td>
<td>P&lt;sub&gt;j&lt;/sub&gt; 0.1</td>
<td>741</td>
<td>1081</td>
<td>1421</td>
<td>1761</td>
<td>2101</td>
</tr>
<tr>
<td>6.8</td>
<td>0.1</td>
<td>661</td>
<td>1001</td>
<td>1341</td>
<td>1681</td>
<td>2021</td>
</tr>
<tr>
<td>7.6</td>
<td>0.2</td>
<td>581</td>
<td>921</td>
<td>1261</td>
<td>1601</td>
<td>1941</td>
</tr>
<tr>
<td>8.3</td>
<td>0.3</td>
<td>501</td>
<td>841</td>
<td>1181</td>
<td>1521</td>
<td>1861</td>
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<tr>
<td>9.1</td>
<td>0.3</td>
<td>421</td>
<td>761</td>
<td>1101</td>
<td>1441</td>
<td>1781</td>
</tr>
</tbody>
</table>

Conclusion
Return to labor = $1,451/cow per year
Decision trees
An example for mastitis

Pinzón-Sánchez et al. (2011)
Simulation of dairy farm systems
Whole or part of the system

Essential for informed decision-making

Useful to describe interrelated system parts

Basis for assessing & assimilating available information

Detect need or lack of science-based knowledge

Assist management control of dairy farm systems
Simulation of dairy farm systems

The process

System & Goals

Data Analysis

Model Construction

Model Validation

Sensitivity Analysis

Assist Decision
## Simulation techniques

### Dairy farm systems

<table>
<thead>
<tr>
<th></th>
<th>Static</th>
<th>Dynamic</th>
<th>Deterministic</th>
<th>Probabilistic</th>
<th>Random</th>
<th>Simulation</th>
<th>Optimization</th>
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</thead>
<tbody>
<tr>
<td>Gross margin</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
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<td>☑</td>
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<tr>
<td>Partial budgeting</td>
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<td>☑</td>
<td>☑</td>
<td>☑</td>
<td></td>
<td>☑</td>
<td></td>
</tr>
<tr>
<td>Cost-benefit</td>
<td></td>
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<td>☑</td>
<td>☑</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear programming</td>
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<td>☑</td>
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<td></td>
<td>☑</td>
</tr>
<tr>
<td>Dynamic programming</td>
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<td></td>
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<td>☑</td>
<td></td>
<td></td>
<td>☑</td>
</tr>
<tr>
<td>Markov-chain</td>
<td>☑</td>
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<td>☑</td>
<td></td>
<td></td>
<td>☑</td>
</tr>
<tr>
<td>Monte-Carlo</td>
<td>☑</td>
<td></td>
<td></td>
<td></td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
</tbody>
</table>
Linear programming
Optimize objective function

**Principles**
- Function to optimize
- Limited resources
- Several ways to use

**Elements**
- Objective function
- Constraints
- Solving algorithm
- Feasible solution
Linear programming
An example

Problem

• Maximize IOFSC = \( \text{Max}(\text{Milk Value} - \text{Feed Cost}) \)
• Limited resources = Corn, SBM, RUP, RDP

<table>
<thead>
<tr>
<th></th>
<th>Upper limit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$/T</td>
</tr>
<tr>
<td>Milk</td>
<td>396</td>
</tr>
<tr>
<td>Corn</td>
<td>228</td>
</tr>
<tr>
<td>SBM</td>
<td>363</td>
</tr>
<tr>
<td>RUP</td>
<td>-</td>
</tr>
<tr>
<td>RDP</td>
<td>-</td>
</tr>
</tbody>
</table>
Linear programming

An example

**Milk Value**

\[ \text{Milk production} \times \text{Milk price} \]

**Feed Cost**

\[ \text{Feed used} \times \text{Feed prices} \]

\[ f (\text{RUP}, \text{RDP}) \]
Linear programming
An application = IOFSC

---

### Set Source of Energy Supplements and Prices

<table>
<thead>
<tr>
<th></th>
<th>Price ($/bu)</th>
<th>Current Diet (lb)</th>
<th>Upper Limit (lb)</th>
<th>Optimal (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>27-Corn-CGG</td>
<td>6</td>
<td>16</td>
<td>17</td>
<td>16.66</td>
</tr>
<tr>
<td>8-Barley-BGR</td>
<td>4.8</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>116-Wheat-WGR</td>
<td>7.4</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### Set the Source of Protein, Byproduct Supplements and Prices

<table>
<thead>
<tr>
<th></th>
<th>Price ($/ton)</th>
<th>Current Diet (lb)</th>
<th>Upper Limit (lb)</th>
<th>Optimal (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>106-Soybean Meal-SBM</td>
<td>330.00</td>
<td>5</td>
<td>6</td>
<td>5.17</td>
</tr>
<tr>
<td>25-Corn Gluten Meal-CGM</td>
<td>550.00</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>24-Corn Gluten Feed-CGF</td>
<td>160.00</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>23-Corn Distiller Grains-CDG</td>
<td>140.00</td>
<td>5</td>
<td>5</td>
<td>5.00</td>
</tr>
<tr>
<td>109-Soybean Whole Roasted- HSB</td>
<td>318.00</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>104-Soybean Meal Expellers-SBMx</td>
<td>402.00</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
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<tr>
<td>14-Blood Meal Ring Dried-BMRD</td>
<td>900.00</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
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<tr>
<td>Urea</td>
<td>635.00</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### Set the Upper Limits for RUP and RDP, and Milk Price

<table>
<thead>
<tr>
<th></th>
<th>Upper Limit</th>
<th>% of Diet DM</th>
<th>Amount in Diet</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUP</td>
<td>6.50%</td>
<td>6.16%</td>
<td></td>
</tr>
<tr>
<td>RDP</td>
<td>12.00%</td>
<td>12.00%</td>
<td></td>
</tr>
<tr>
<td>CP</td>
<td>18.50%</td>
<td>18.17%</td>
<td></td>
</tr>
</tbody>
</table>

### Perform Optimization, Maximize IOFSC

<table>
<thead>
<tr>
<th></th>
<th>Current</th>
<th>Optimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>lb/cow/day</td>
<td>81.00</td>
<td>82.46</td>
</tr>
<tr>
<td>$/cow/day</td>
<td>11.69</td>
<td>11.86</td>
</tr>
</tbody>
</table>

---

Cabrera et al. (2009)
Dynamic programming
Sequential optimization

Principles
• Optimal policy
• Stage = time
• State = cow
• Objective function

Least cost = 12
Policy = 2,1 to 3,2

Kalantari and Cabrera (2012)
Markov chains
Sequential simulation

**Principles**
- Stage = time
- State  = cow
- Transition probabilities
- Steady state

**States**
- Parity
- Days in milk
- Pregnancy
- Production levels
- Disease
- ...
Markov chains

An example

State of nature. E.g., Diseased cow

Transition probability
Markov chains

An example

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.20</td>
<td>0.25</td>
<td>0.30</td>
</tr>
<tr>
<td>B</td>
<td>0.80</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>C</td>
<td>0.00</td>
<td>0.75</td>
<td>0.70</td>
</tr>
<tr>
<td>Total</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
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</table>

<table>
<thead>
<tr>
<th>t</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

0
0.25
0.5
0.75
1

1
2
3
4
5
6
7
8
Markov chains
An application

Cabrera (2012)
Markov chains

An application

Cow REPL=3, MIM=5, MIP=1

Cow Value = $625

Cabrera (2012)
Markov chains
An application

$897
Economic value of a non-pregnant cow in second lactation one month after calving

Cabrera (2012)
Economic value of a dairy cow

Practical decision-making

Cull or not cull
Positive cow value indicates cow brings more value than replacement

Cows in different lactations:
- 8 MIM, 2 MIP

Graph showing economic value over lactations:
- Average
- +20% milk
- -20% milk

Values:
- $1,900
- $1,320
- $740
- $160
- $1,320
- $1,900
- $1,000
- $420
- $1,000

Lactation numbers:
1  2  3  4  5  6  7  8
Economic value of a dairy cow

Practical decision-making

Breed or not breed
Better chance for higher value cows

Months after calving

- $500
- $420
- $880
- $1,340
- $1,800

- $40
- $420
- $880
- $1,340
- $1,800

2nd lactation cow

Average
+20% milk
-20% milk
Economic value of a dairy cow
Practical decision-making

Treat or not treat
More investment allowed in higher value cows

Cow value, $

Months after calving

- $225
- $225
- $450
- $675
- $900

Open
Pregnant 3 MIM
Pregnant 5 MIM
Pregnant 7 MIM

2nd lactation cow
Economic value of a dairy cow
Practical decision-making

Calculate the value of a pregnancy
Difference between pregnant and non-pregnant

<table>
<thead>
<tr>
<th>Months after calving</th>
<th>1st Lactation</th>
<th>2nd Lactation</th>
<th>3rd Lactation</th>
<th>4th Lactation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>$125</td>
<td>$154</td>
<td>$183</td>
<td>$211</td>
</tr>
<tr>
<td>4</td>
<td>$154</td>
<td>$183</td>
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<td>$240</td>
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<td>5</td>
<td>$183</td>
<td>$211</td>
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<td>6</td>
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<td>7</td>
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<tr>
<td>8</td>
<td>$269</td>
<td>$298</td>
<td>$327</td>
<td>$356</td>
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</tbody>
</table>
Economic value of a dairy cow
Practical decision-making

Calculate the cost of a pregnancy loss
Difference between non-pregnant and pregnant

<table>
<thead>
<tr>
<th>Months in pregnancy</th>
<th>1st Lactation</th>
<th>2nd Lactation</th>
<th>3rd Lactation</th>
<th>4th Lactation</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>$170</td>
<td>$353</td>
<td>$535</td>
<td>$718</td>
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<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Economic value of a dairy cow

Practical decision-making

Calculate the cost of a day open
Difference between value of non-pregnant cow in 2 successive days

E.g., $5.16 (month 2-3) and $4.26 (month 5-6)
Markov chains

Another application: Herd value
Markov chains

Another application: Herd value

Herd net return ($)
Aggregation of individual cow’s net return

Cabrera (2012)
Markov chains
Herd value calculation

$1,969/cow per year
Average net return of a cow in the herd according to herd production, reproduction, and economic variables

Cabrera (2012)
Herd value
Practical decision-making

Calculate the value of improved reproductive performance
Herd value difference of reproductive efficiency

E.g., value of improving 21-d pregnancy rate from 15 to 20% is $50/cow per year
Herd value

Practical decision-making

Calculate the value of decreased culling rate
Herd value difference of changed culling rate

E.g., value of decreasing culling rate from 40 to 35% is $19/cow per year
Herd value

Practical decision-making

Calculate the value of increased productivity
Herd value difference of changed rolling herd average (cow average production in a year)

E.g., value of improving RHA from 10.9 to 12.3 kg/cow per yr is $295/cow per year
Dairy feed cost evaluator

Benchmarking income over feed cost

**Income over feed cost**
Milk value - feed cost  
(very simple concept)

**Important to benchmark**
Against historical data  
Against peers

**Dynamic procedure**
Permanent cycle of data collection, analysis, and decision making

**Enables informed decisions**
purchase feeds, price risk management, ration adjustment, etc.

http://extension.psu.edu/animals/dairy
Dairy feed cost evaluator
How to benchmark IOFC

Collect farm data

Analyze farm data

Compare farm data
Dairy feed cost evaluator

Data collection scheme

Collector 1
- Farm 1
- Farm 2

Collector 2
- Farm 1
- Farm 2
- Farm 3
- Farm 4

Collector 3
- Farm 1
Dairy feed cost evaluator

Data collection scheme

Welcome to IOFC Database. These are the suggested steps for using the system.

1. In this page, you can add or delete farms. To add a farm enter a farm name and select the county where the farm is located and click "Add Farms". To delete a farm, delete the farm name and click save.

2. Once the farms are defined, you can start defining the "Ingredients" on the ingredients page, their DM composition, and prices used on each particular farm.

3. Once the ingredients are entered, you can define the rations for different group of cows in the "Ration" page.

4. Once you have defined all ingredients and rations, you can see the IOFC summary at the "Summary" page. On this page, you would first need to enter the milk production and price.
Dairy feed cost evaluator

Data collection scheme

Farm 1

- Milk income
  - Milk quantity
  - Milk price
- Feed Cost
  - Feed quantity
  - Feed price
## Dairy feed cost evaluator

### Data collection scheme

<table>
<thead>
<tr>
<th>Forage</th>
<th>%DM</th>
<th>Price As Fed $/ton</th>
<th>Price DM $/ton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn Silage 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hay Forage 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mx. Silage–MxSi</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hay Forage</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Silage Mature&gt;46% NDF–Si50</td>
<td></td>
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<tr>
<td>Silage Mid–mature 40–46% NDF–Si43</td>
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<tr>
<td>Silage Inmature&lt;40% NDF–Si40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>wheat straw</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>aggregate</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dairy feed cost evaluator

Data collection scheme

<table>
<thead>
<tr>
<th>Ration Group Information</th>
<th>Name</th>
<th>Number</th>
<th>Milking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ration Group 1</td>
<td>Ration 1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Ration Group 2</td>
<td>Ration 2</td>
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<td></td>
</tr>
<tr>
<td>Ration Group 3</td>
<td>Ration 3</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Ration Group 4</td>
<td>Ration 4</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Ration Group 5</td>
<td>Ration 5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Ration Group 6</td>
<td>Ration 6</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Ration Group 7</td>
<td>Ration 7</td>
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<tr>
<td>Ration Group 8</td>
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<tr>
<td>Ration Group 9</td>
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</tbody>
</table>

Farm Name: Finalise
Month: February 2013
Dairy feed cost evaluator

Data collection scheme

<table>
<thead>
<tr>
<th>Total DMI (lb/cow/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ration 1</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total DMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual DMI</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Forage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ration Group (lb/cow/d)</td>
</tr>
<tr>
<td>Ration 1</td>
</tr>
<tr>
<td>---------------------------------</td>
</tr>
<tr>
<td>Corn Silage—Cosi</td>
</tr>
<tr>
<td>Hay Forage</td>
</tr>
<tr>
<td>Mx. Silage—MxSi</td>
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<tr>
<td>Hay Forage</td>
</tr>
<tr>
<td>Silage Mature&gt;46% NDF—Si</td>
</tr>
<tr>
<td>Silage Mid—mature 40–46%</td>
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<tr>
<td>Silage Inmature&lt;40% NDF—</td>
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<tr>
<td>wheat straw</td>
</tr>
</tbody>
</table>
## Dairy feed cost evaluator

### Data summary

<table>
<thead>
<tr>
<th>Forage</th>
<th>Energy/Protein Suppel</th>
<th>Min-Vit &amp; Additive Supp</th>
<th>Total Feed</th>
<th>DMI (lb/cow/d)</th>
<th>Feed Costs ($/cow/d)</th>
<th>Number of Cows (#)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ration 1</td>
<td>Dry</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Purchased</td>
<td>Home-Grown</td>
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<tr>
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<td>DMI</td>
<td>Cost</td>
<td>DMI</td>
<td>Cost</td>
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<tr>
<td>Forage</td>
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<td>0</td>
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</tr>
<tr>
<td>Energy/Protein Suppel</td>
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</tr>
<tr>
<td>Min-Vit &amp; Additive Supp</td>
<td>0</td>
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<td>0</td>
<td>-</td>
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<td></td>
</tr>
<tr>
<td>Total Feed</td>
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</tbody>
</table>

### Summary

<table>
<thead>
<tr>
<th>Summary</th>
<th>Milking</th>
<th>Dry</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMI (lb/cow/day)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MILK/DMI</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>FCM/DMI</td>
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</tr>
<tr>
<td>ECM/DMI</td>
<td>0</td>
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</tr>
<tr>
<td>INCOME OVER FEED COSTS (IOFC) ($/cow/day)</td>
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</tr>
<tr>
<td>Income over Feed Costs per CWT(IOFC/cwt) ($/cwt)</td>
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<td></td>
</tr>
<tr>
<td>Feed Costs per DMI ($/cwt)</td>
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</tbody>
</table>
Dairy feed cost evaluator

Data analyses

<table>
<thead>
<tr>
<th>Farm</th>
<th>Milking Cows</th>
<th>Month</th>
<th>Compare all your farms with all farms from</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm1</td>
<td>Less than 100</td>
<td>June 2010</td>
<td>cabrera</td>
</tr>
<tr>
<td>Farm2</td>
<td>100 to 350</td>
<td>May 2010</td>
<td></td>
</tr>
<tr>
<td>Farm3</td>
<td>350-500</td>
<td>April 2010</td>
<td></td>
</tr>
<tr>
<td>Farm4</td>
<td>Greater than 500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farm5</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

(Ctrl + Click to Make Multiple Selection)
- Standardized
- Farms/Mailbox
Dairy feed cost evaluator

Data analyses

Graphical Representation
(Click on the Data field for more information)
Dairy feed cost evaluator

Data analyses
Dairy feed cost evaluator
Case study

9 Wisconsin dairy farms
Around 12,000 cows

Fond Du Lac
Central East part of the State

Collector
Paul Dyk (former Extension agent)
Dairy feed cost evaluator
Wisconsin case study

Farm6 = $8.59/cow/day
Highest = $10.76
Lowest = $7.46

2nd Lowest = $2.17

Why the big differences?
Dairy feed cost evaluator
Wisconsin case study: Feed costs

Farm6 = $4.36/cow/day

3rd Lowest
Dairy feed cost evaluator
Wisconsin case study: Feed costs

![Graph showing feed cost evaluation across farms.](image-url)
Dairy feed cost evaluator
Wisconsin case study: Dry matter intake

Farm 6 = 52.7 lb/cow/d, 5th highest
Dairy feed cost evaluator
Wisconsin case study: Milk (lb/cow per d)

Farm6 = 85 lb/cow/d  3rd lowest
Dairy feed cost evaluator
Wisconsin case study: Feed efficiency

![Chart showing feed efficiency for different farms]

Rank=8
Dairy feed cost evaluator
Wisconsin case study: Milk price

Farm 6 = $15.24/cwt milk
Lowest
Dairy feed cost evaluator
Wisconsin case study: Milk components

<table>
<thead>
<tr>
<th>Farm</th>
<th>Milk3Butterfat3(%)</th>
<th>Milk3Protein3(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm1</td>
<td>2.5</td>
<td>2.7</td>
</tr>
<tr>
<td>Farm2</td>
<td>2.7</td>
<td>2.9</td>
</tr>
<tr>
<td>Farm3</td>
<td>2.9</td>
<td>3.1</td>
</tr>
<tr>
<td>Farm4</td>
<td>3.1</td>
<td>3.3</td>
</tr>
<tr>
<td>Farm5</td>
<td>3.3</td>
<td>3.5</td>
</tr>
<tr>
<td>Farm6</td>
<td>3.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Farm7</td>
<td>3.7</td>
<td>3.9</td>
</tr>
<tr>
<td>Farm8</td>
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</tr>
<tr>
<td>Farm9</td>
<td>3.9</td>
<td>3.9</td>
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</tbody>
</table>

Rank=1: Farm7
Rank=4: Farm1
Dairy feed cost evaluator
Wisconsin case study: Milk revenue

Farm6 = $12.95/cwt milk
2nd Lowest
Dairy feed cost evaluator

Farm6 improvement plan

Look for better milk price
Good milk components, but lowest price received: Opportunity to negotiate

Improve feed efficiency
Look for enhanced production at DMI level
Maintain production at lower DMI level
Check feed quality permanently

Reduce feed costs
Homegrown and purchased
Forages and concentrates
Thanks