

The economic value of a dairy cow and its relationship with reproduction performance

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What is the cow value?

What the cow value means?

**Discounted future net
return of a cow**

- Compared to a replacement



Vs.

General interpretation

- Positive (+) cow value = keep
- Negative (-) cow value = replace



Importance of the cow value

Critical economic implications

Optimal management

- Keep or replace

Important information

- Value of pregnancy
- Cost of pregnancy loss
- Cost of a day open

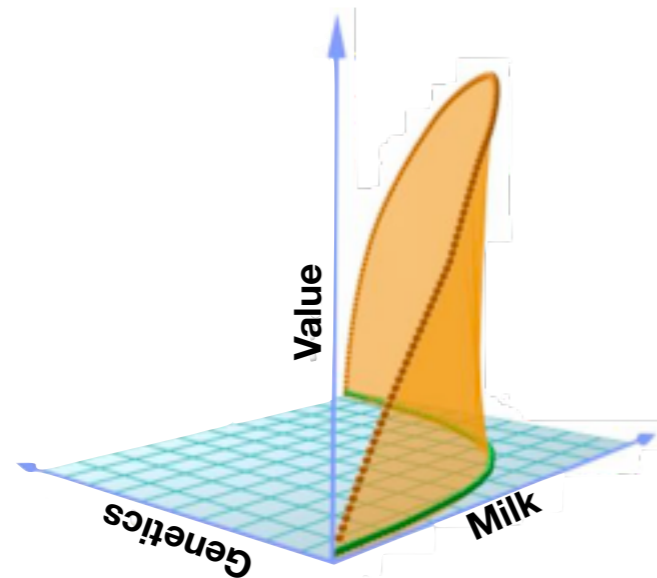
Crucial decisions

- Treat or not treat
- Breed or not breed
- Other **reproductive** decisions...



The most important factors

Variables with large impact

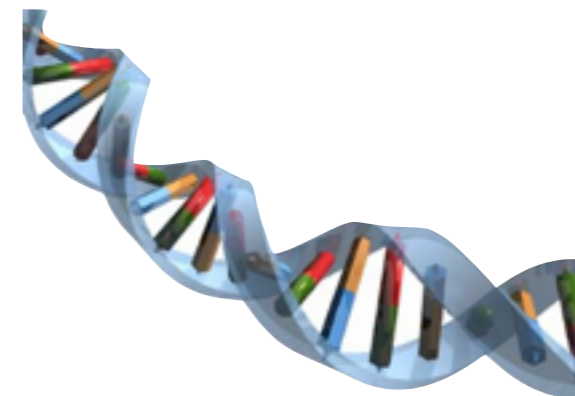


Evaluated cow

- Milk this lactation
- Milk future lactations

Replacement

- Expected genetic gain



Important information

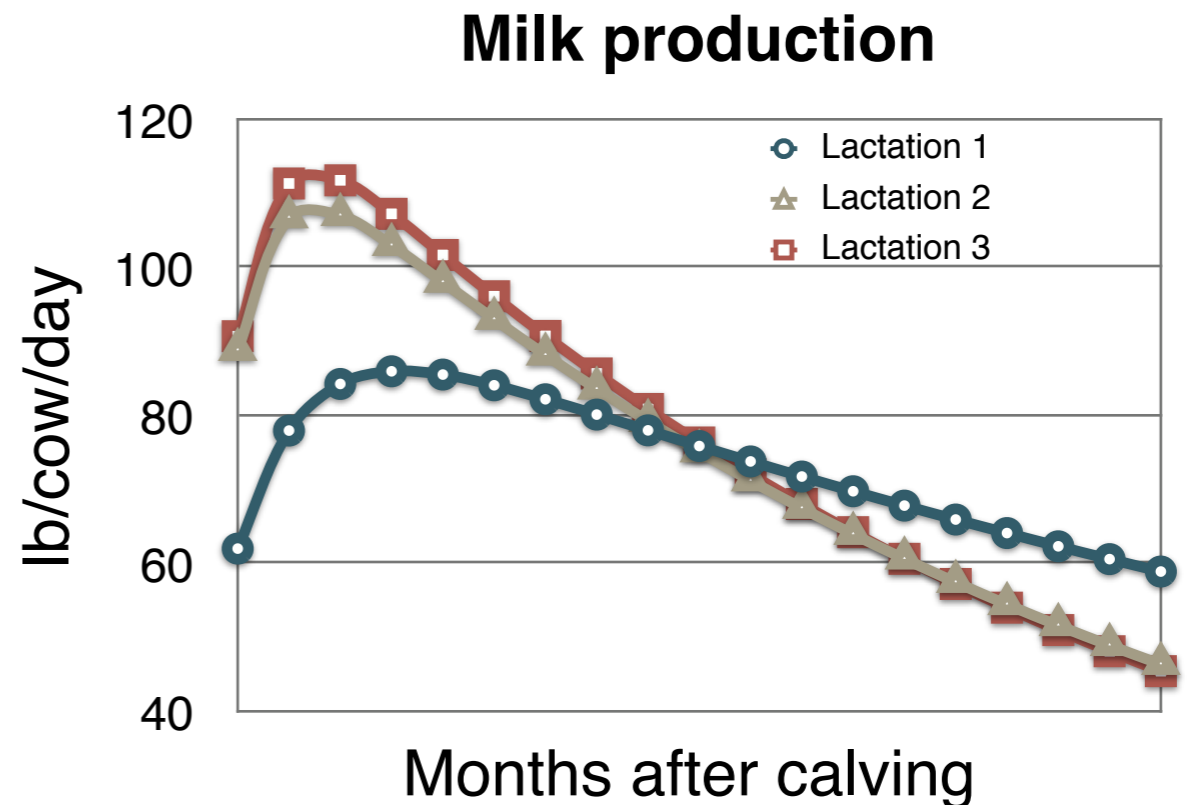
Herd level

Milk production

- Rolling herd average
- Butterfat content

21-d pregnancy rate

- Percentage of cows becoming pregnant every 21 days



Other important information

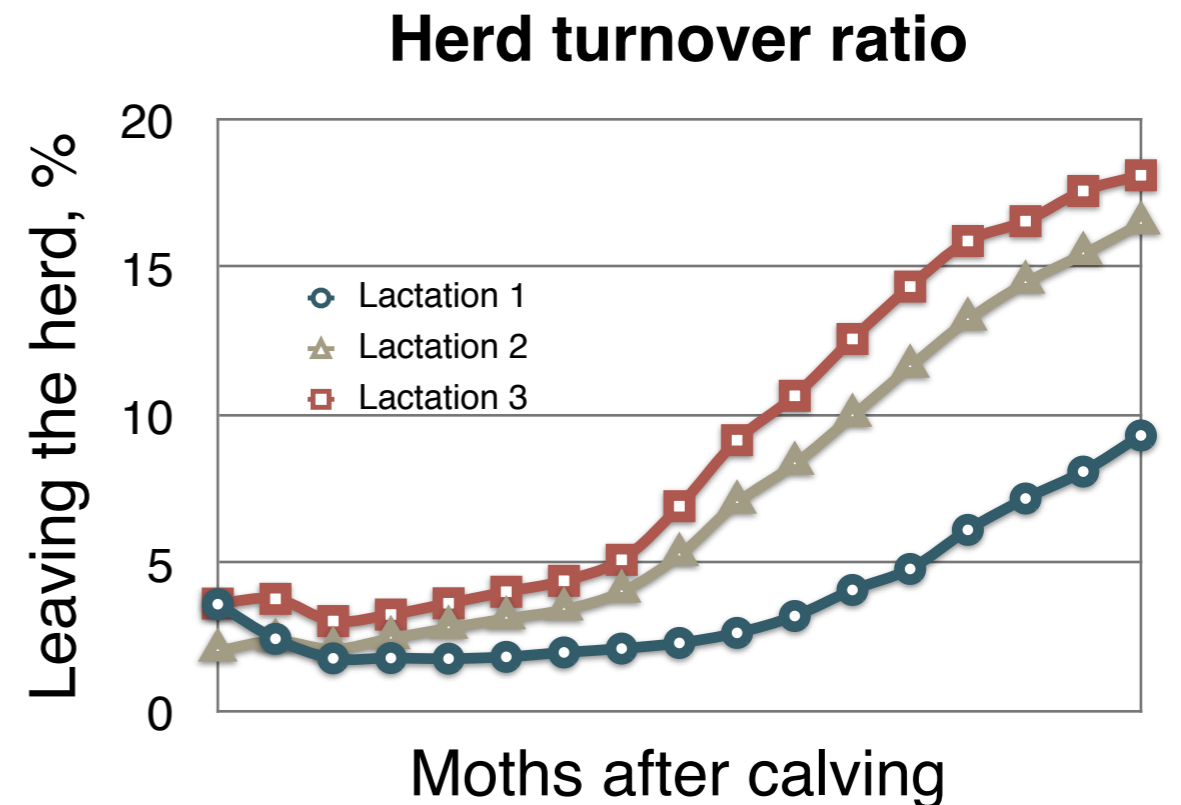
Herd level

Herd turnover ratio

- Percentage of animals leaving the herd

Reproductive replacement

- Last month to breed non-pregnant cows
- Milk threshold to replace do-not-breed cows



More important information

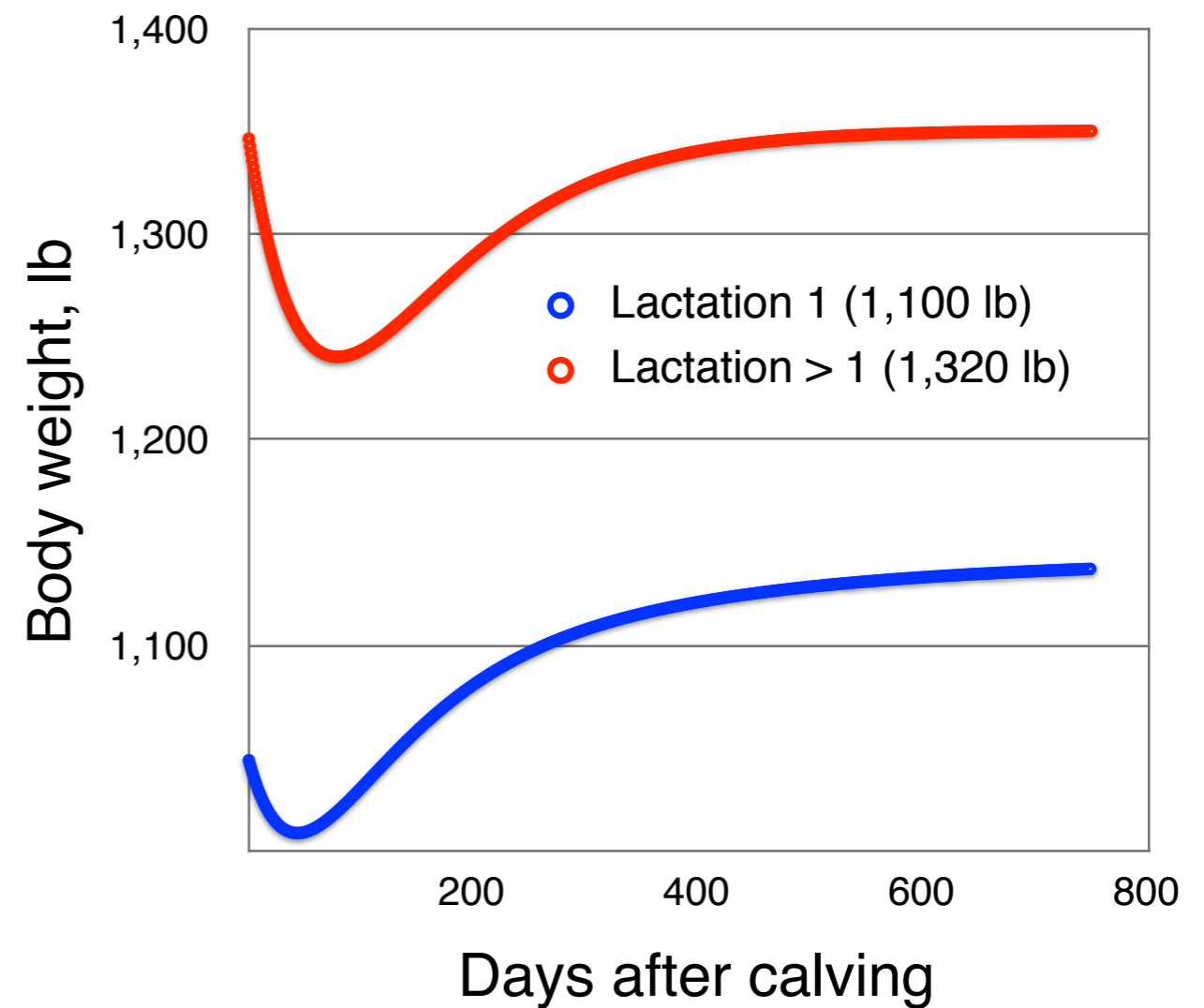
Herd level

Body weight

- Within a lactation
- Between lactations

Pregnancy loss

Abortion of pregnant cows between 35 days and end of gestation



Additional important information

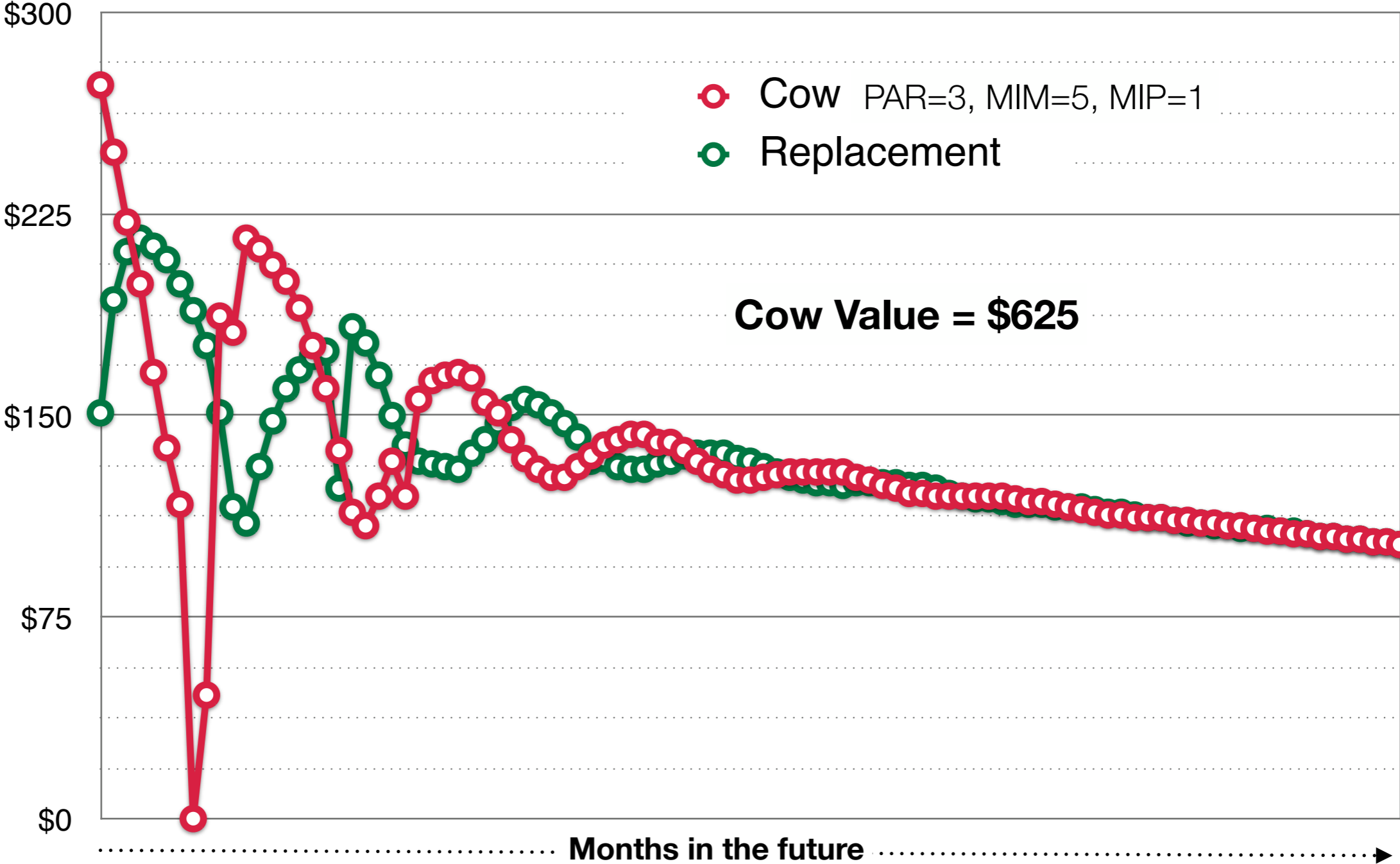
Farm data, economic variables

- Milk price
- Feed cost
- Reproductive cost
- Replacement cost
- Salvage value
- Calf value
- Interest rate



Economic net return

Expected future net returns

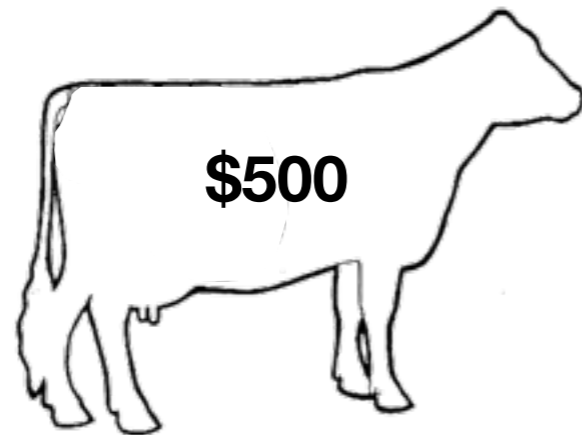


The value of a new pregnancy

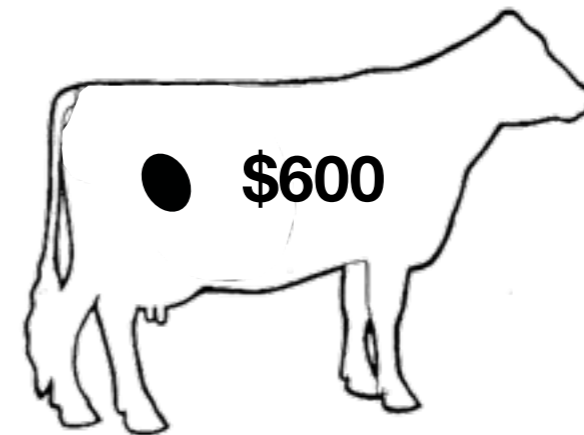
How much more \$ when a cow becomes pregnant?

Difference in cow value:

- Cow **becoming** pregnant
- Cow remaining non-pregnant



Vs.



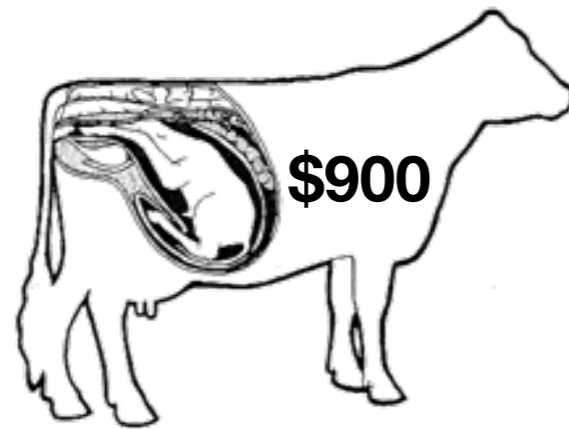
Value of a new pregnancy = **+\$100**

The cost of a pregnancy loss

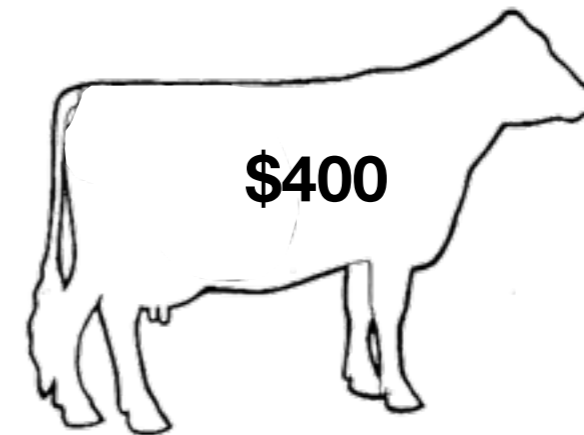
How much less \$ when a cow aborts?

Difference in cow value:

- Cow being pregnant
- Cow **losing** pregnancy



Vs.



Cost of a pregnancy loss = **-\$500**

Model illustration

Average cow and replacement, lactation 2

Open cow value

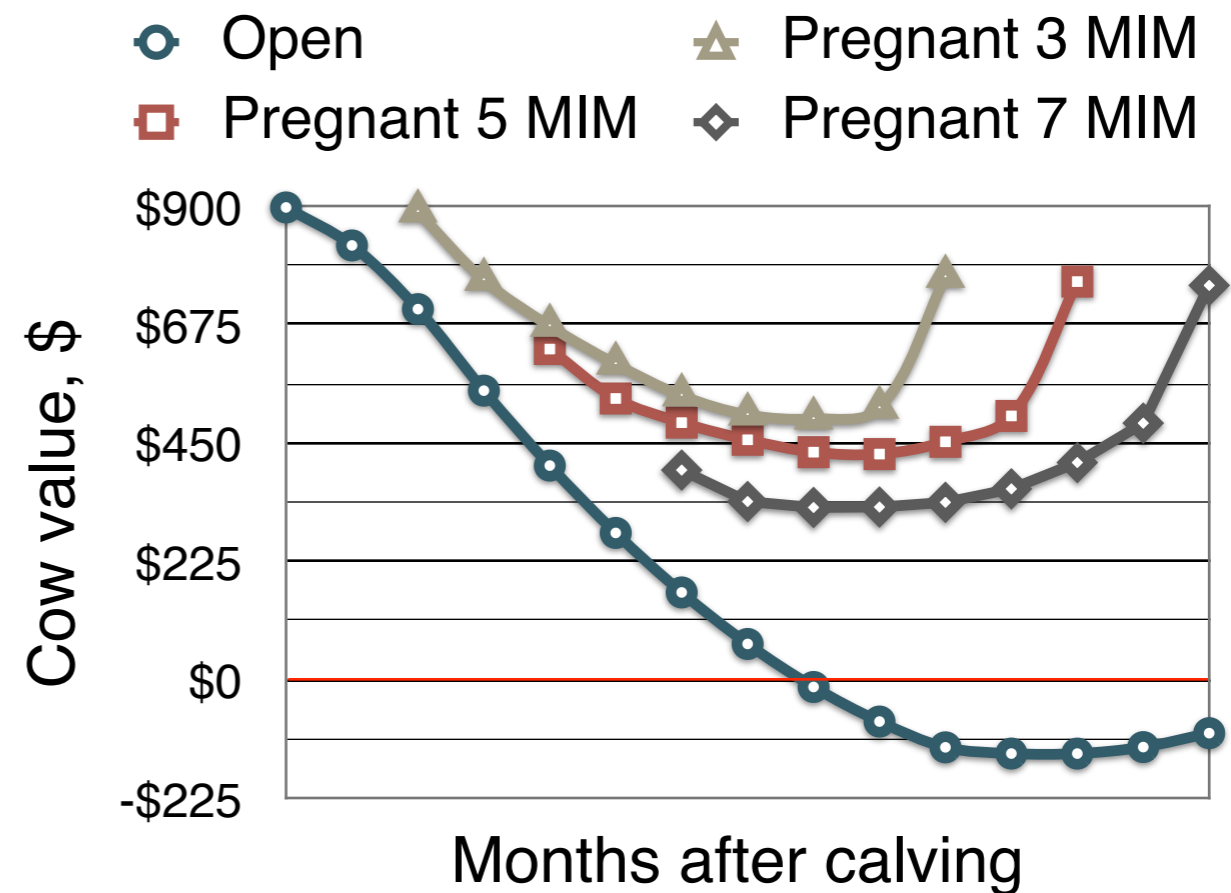
- Decreases
- Becomes negative

Pregnant cow value

- Higher than open
- U-shaped
- Similar value at calving

Overall cow value

- Increases to 3rd or 4rd lactation then decreases



Model illustration

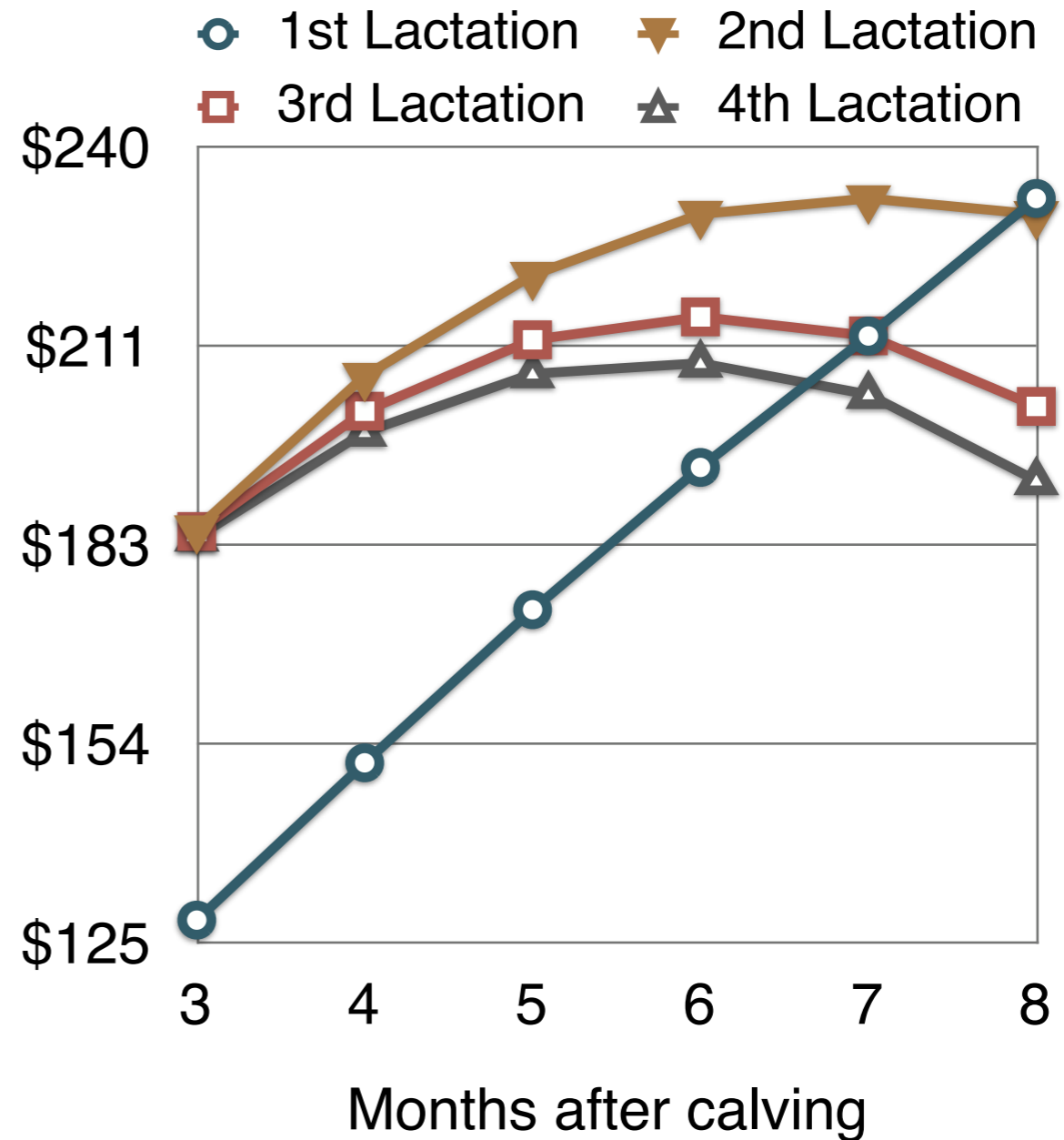
The value of a new pregnancy, \$

First lactation

- Increases drastically
- Keep increasing

Later lactations

- Increases towards mid-lactation
- Decreases towards late lactation



Model illustration

The cost of a pregnancy loss, \$

First lactation and month 5 pregnancy

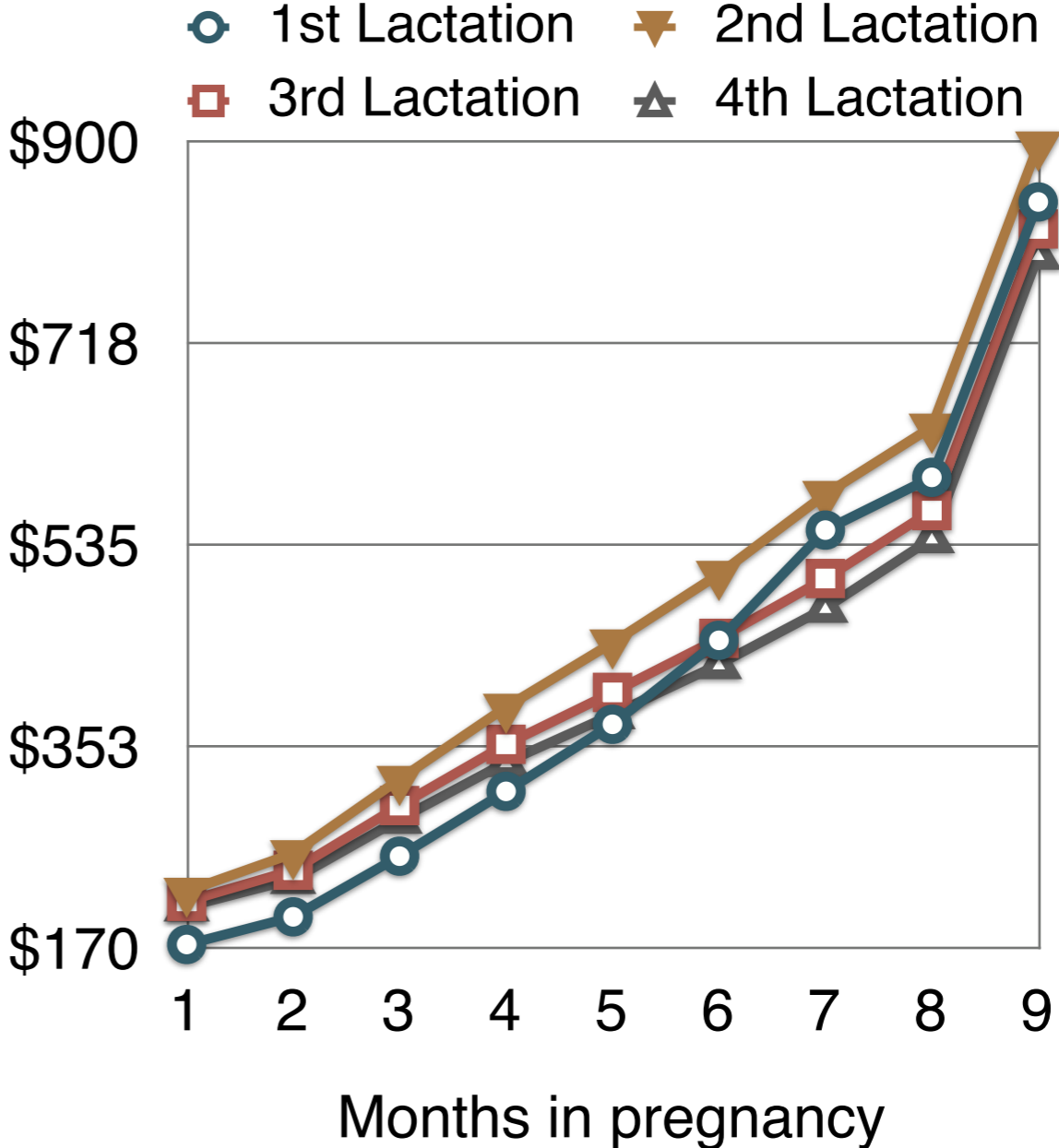
- Increases drastically
- Spikes in last month of pregnancy

Other lactations

- Very similar to first lactation

Other pregnancy months

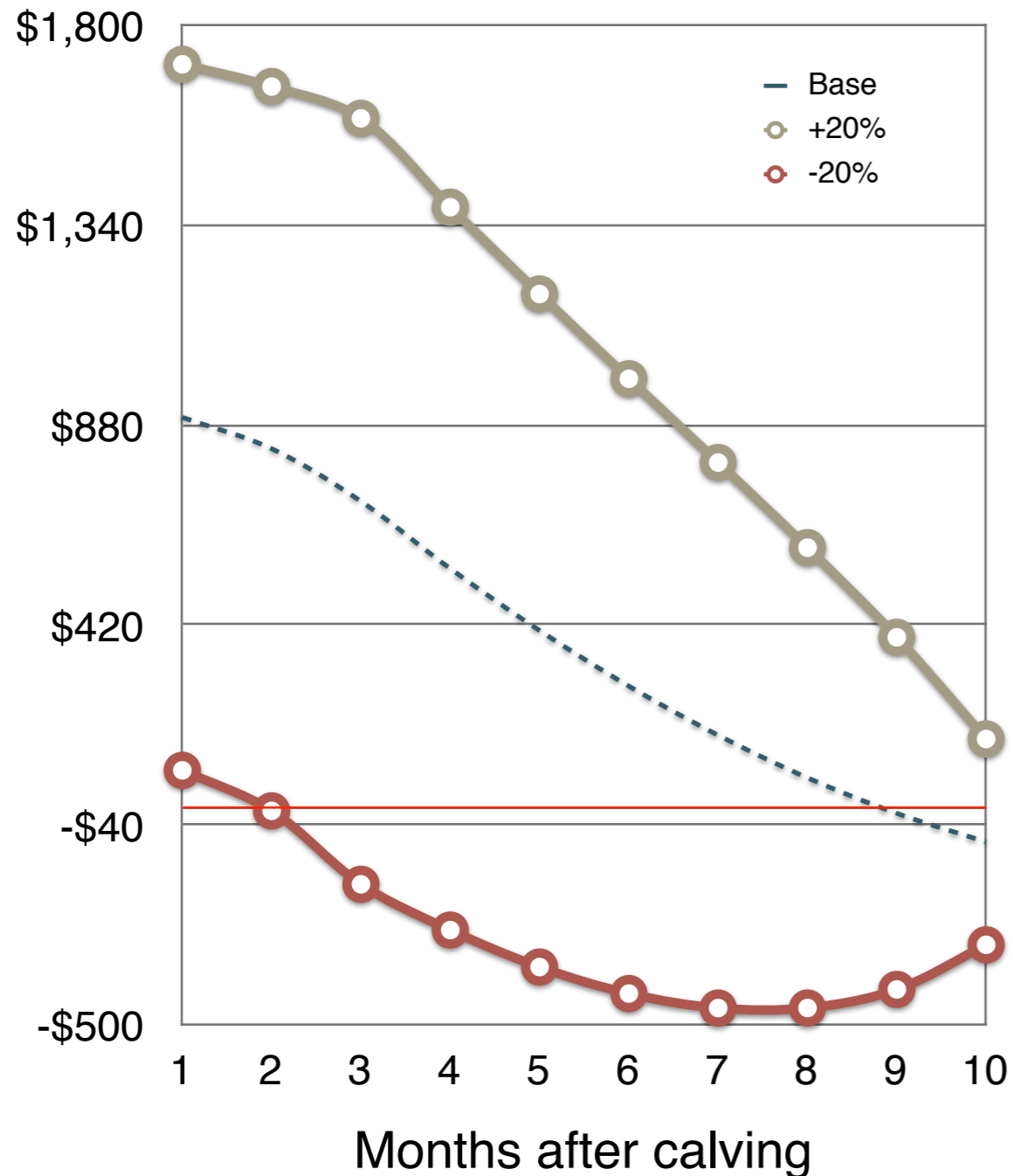
- Very similar to month 5 pregnancy



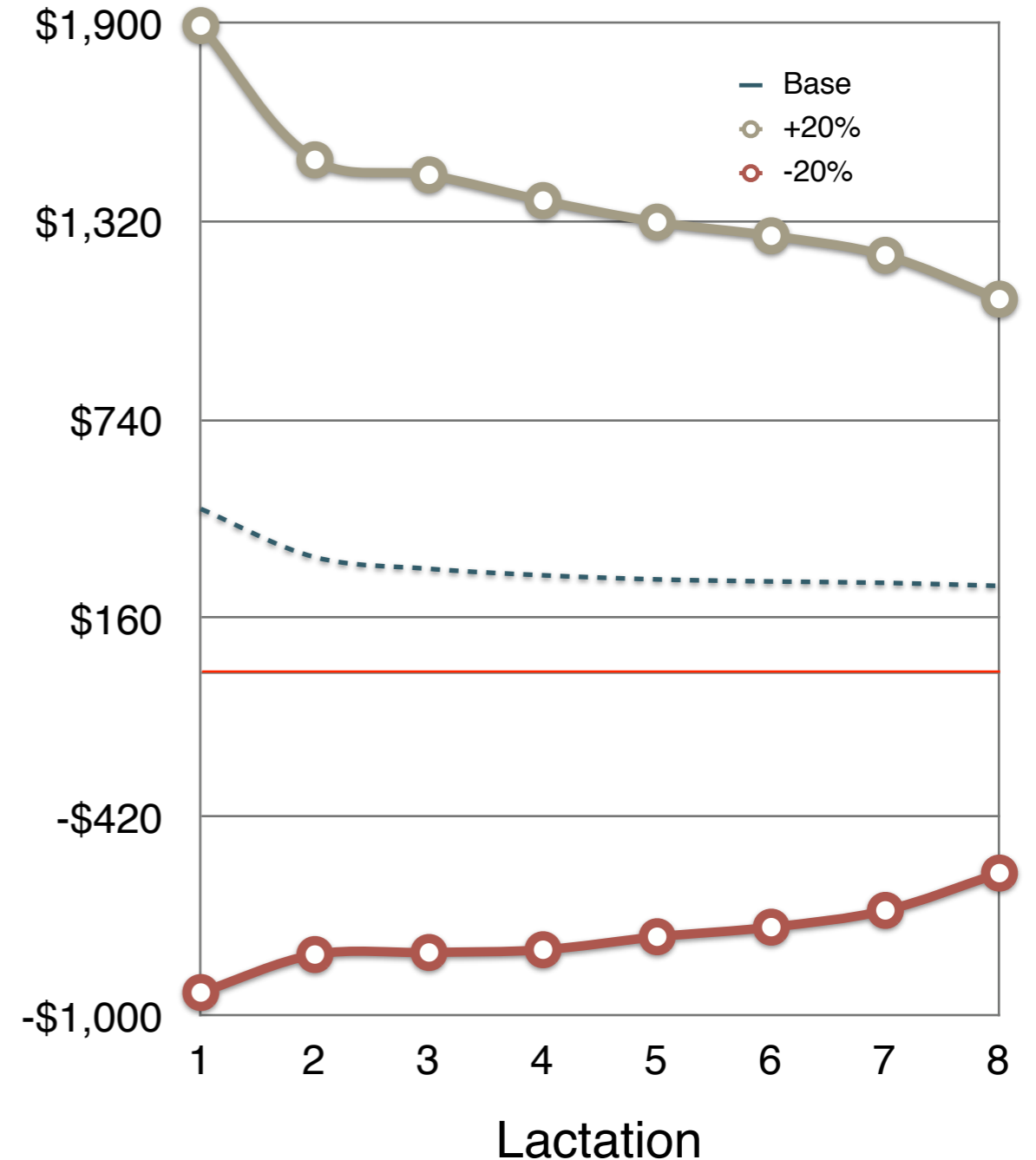
Model illustration

The impact of expected milk productivity, next lactations

Non-pregnant, lactation 2



2 months pregnant, 8 months lactating

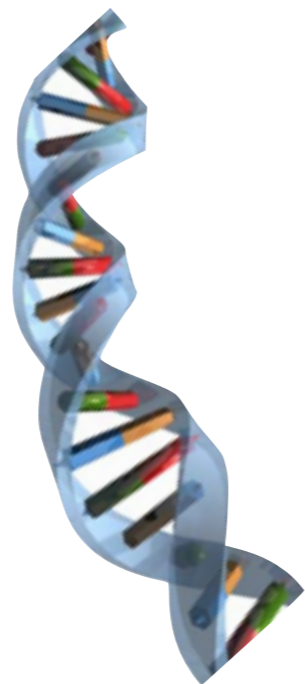


Model illustration

The impact of genetic gain with a replacement

Replacement genetic gain

- Cow value is \$211 lower for every 1% expected improved milk productivity of a replacement



Model illustration

Herd statistics

Economic values, \$/cow per year

Milk sales revenue	3,834
Feed cost	1,522
Calf sales revenue	96
Non-reproductive culling cost	197
Mortality cost	38
Reproductive culling cost	58
Reproductive cost	80

Herd structure

Days in milk	224
Days to conception	122
Percent of pregnant	52
Reproductive culling, %	8
Percent of 1 st parity cows	43
Percent of 2 nd parity cows	27
Percent of 3 rd parity cows	15

Decision support system

Perform your own calculations

Cow value is farm specific

Every farm is different



Farm conditions change dynamically

Cow value and cow net return change

Market conditions change permanently

Might impact decisions



User-friendly application

Easy to use, still robust



The
Free

Overview

Single Cow Analysis

Herd Analysis

INPUTS - Edit Values in This Block

Evaluated Cow Variables

Current Lactation	<input type="text" value="3"/>
Current Months after Calving	<input type="text" value="5"/>
Current Months in Pregnancy	<input type="text" value="1"/>
Expected Milk Production Rest of Lactation, %	<input type="text" value="100"/>
Expected Milk Production Next Lactations, %	<input type="text" value="100"/>

Replacement Cow Variable

Expected genetic improvement, % additional milk	<input type="text" value="0"/>
---	--------------------------------

Herd Production and Reproduction Variables

Herd Turnover Ratio, %/year	<input type="text" value="35"/>
Rolling Herd Average, lb/cow per year	<input type="text" value="24,000"/>
21-d Pregnancy Rate, %	<input type="text" value="18"/>
Reproduction Cost, \$/cow per month	<input type="text" value="20"/>
Last Month After Calving to Breed a Cow	<input type="text" value="10"/>
Do-not-Breed Cow Minimum Milk, lb/day	<input type="text" value="50"/>
Pregnancy Loss after 35 Days Pregnant, %	<input type="text" value="22.6"/>
Average Cow Body Weight, lb	<input type="text" value="1306"/>

Herd Economic Variables

Replacement Cost, \$/cow	<input type="text" value="1300"/>
Salvage Value, \$/lb live weight	<input type="text" value="0.38"/>
Calf Value, \$/calf	<input type="text" value="100"/>
Milk Price, \$/cwt	<input type="text" value="16"/>
Milk Butterfat, %	<input type="text" value="3.5"/>
Feed Cost Lactating Cows, \$/lb dry matter	<input type="text" value="0.1"/>
Feed Cost Dry Cows, \$/lb dry matter	<input type="text" value="0.08"/>
Interest Rate, %/year	<input type="text" value="6"/>

Analyze

OUTPUTS - Interactive Results

Value of the Cow, \$

Compared Against a Replacement, \$

Milk Sales, \$	<input type="text" value="148"/>
Feed Cost, \$	<input type="text" value="-157"/>
Calf Value, \$	<input type="text" value="26"/>
Non-reproductive Cull, \$	<input type="text" value="-126"/>
Mortality Cost, \$	<input type="text" value="-24"/>
Reproductive Cull, \$	<input type="text" value="12"/>
Reproduction Costs, \$	<input type="text" value="45"/>
Replacement Transaction, \$	<input type="text" value="704"/>

Herd Structure at Steady State

Days in milk	<input type="text" value="224"/>
Days to Conception	<input type="text" value="122"/>
Percent of Pregnant	<input type="text" value="52"/>
Reproductive Culling, %	<input type="text" value="8"/>
Mortality, %	<input type="text" value="3"/>
1st Lactation, %	<input type="text" value="43"/>
2 nd Lactation, %	<input type="text" value="27"/>
> 3 rd Lactation, %	<input type="text" value="30"/>

Economics of an Average Cow, \$/year

Net Return, \$	<input type="text" value="1998"/>
Milk Sales, \$	<input type="text" value="3834"/>
Feed Cost, \$	<input type="text" value="-1522"/>
Calf Sales, \$	<input type="text" value="60"/>
Non-Reprod. Culling Cost, \$	<input type="text" value="-198"/>
Mortality Cost, \$	<input type="text" value="-38"/>
Reproductive Culling Cost, \$	<input type="text" value="-59"/>
Reproductive Cost, \$	<input type="text" value="-80"/>

The
Use

Overview

Single Cow Analysis

Herd Analysis

INPUTS - Edit Values in This Block

Download Parameter Excel File

[Download Parameters File](#)

Upload Parameters as Excel File

Select the Excel File:

no file selected

Replacement Cow Variable

Expected genetic improvement, % additional milk

Herd Production and Reproduction Variables

Herd Turnover Ratio, %/year

Rolling Herd Average, lb/cow per year

21-d Pregnancy Rate, %

Reproduction Cost, \$/cow per month

Last Month After Calving to Breed a Cow

Do-not-Breed Cow Minimum Milk, lb/day

Pregnancy Loss after 35 Days Pregnant, %

Average Cow Body Weight, lb

Herd Economic Variables

Replacement Cost, \$/cow

Salvage Value, \$/lb live weight

Calf Value, \$/calf

Milk Price, \$/cwt

Milk Butterfat, %

Feed Cost Lactating Cows, \$/lb dry matter

Feed Cost Dry Cows, \$/lb dry matter

Interest Rate, %/year

OUTPUTS - Interactive Results

Select an Excel file containing the farm data on the left and click the Analyze button at the bottom to analyze the data.

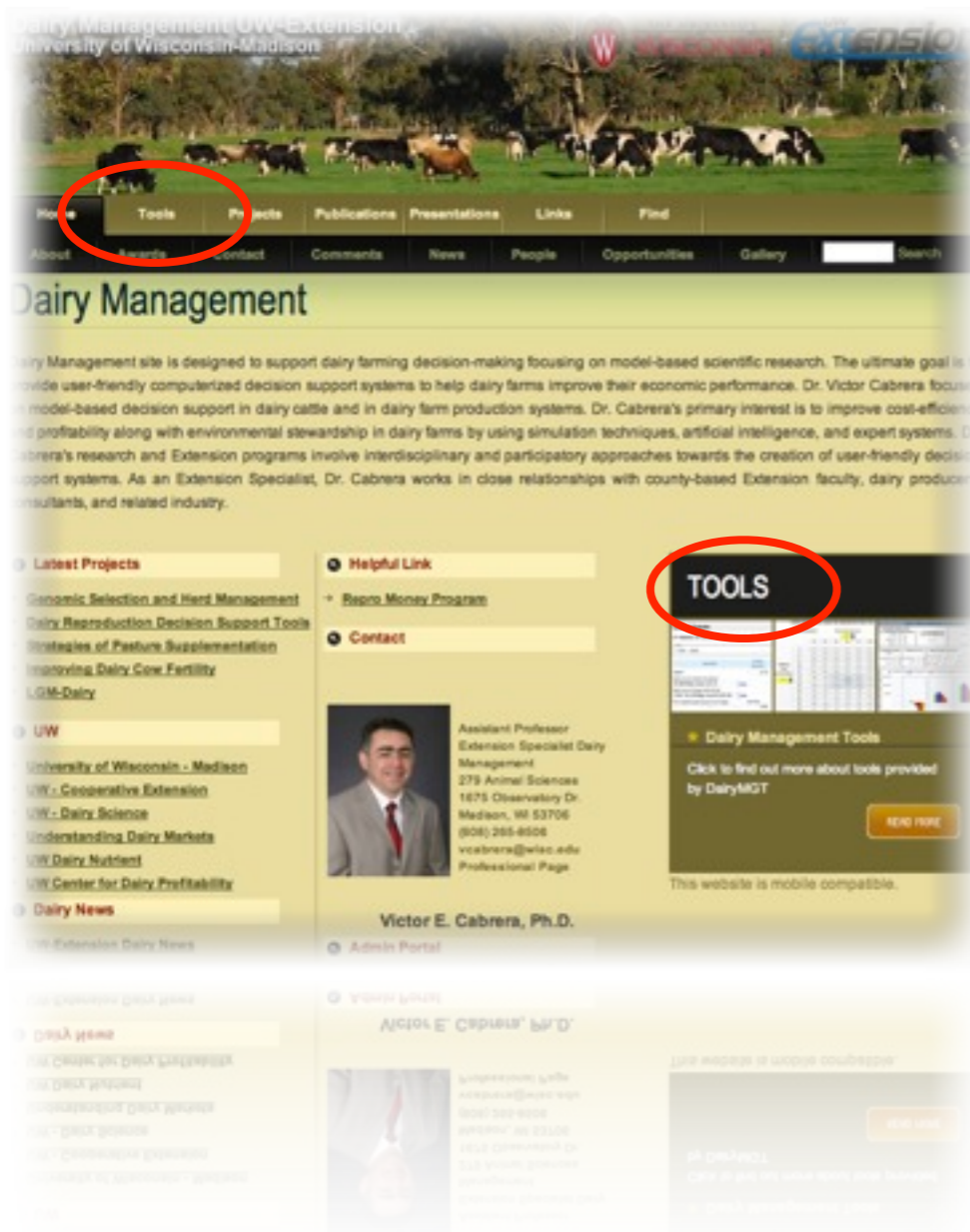
The evaluated data will be available for download as an Excel spreadsheet.

NOTE: Please limit the number of cows in the spreadsheet to 1,600 as the server cannot support larger number of calculations at the moment. If the herd contains a larger number of cows, please split the data into multiple spreadsheets so that the maximum number of cows in each spreadsheet is 1,600 and try performing the calculations by uploading each spreadsheet individually. The data gathered from the downloaded spreadsheets can then be merged using a spreadsheet program like Microsoft Excel or [LibreOffice Calc](#).

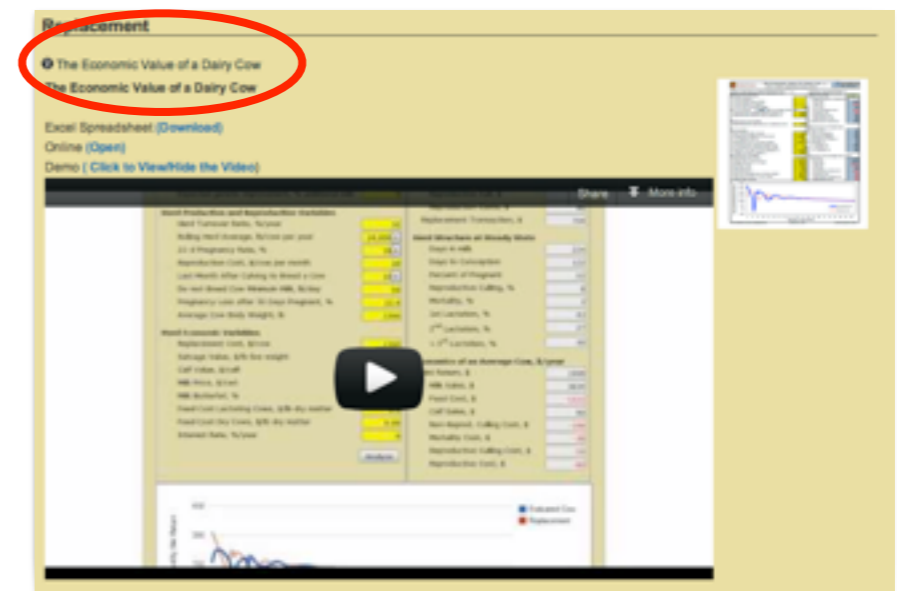
The economic value of a dairy cow

Where to find it

DairyMGT.info



Tools





AgSource Herd Selection Guide

Individual cow breeding and replacement decisions

Milk productivity this
lactation

$$\frac{\text{Cow ME}}{\text{Avg. ME}}$$

Milk productivity next
lactations

$$\frac{\text{Lifetime ME} - (\text{Lifetime Cow SCC} - \text{Avg. SCC}) * \text{Loss}}{\text{Avg. ME}}$$

Ctrl Num	Identification and Status				Reproduction					Current Lactation			Lifetime Average			Genetics		Test Day		Exp. Rel. \$
	Barn Name	Lact	Calv date	DIM	Last Bred	Serv Sire	No. Serv	Days Open	Repro Status /DCC	ME Milk	LS SCC	TCI	ME Milk	LS SCC	TCI	NM\$	Gen Ind.	Milk	LS SCC	
3241	1522	1	9/25/11	DRY	3/29/12	7HO08946	2	186	P/233	46513	1.1		46513	1.1		99				\$4,576
3304	1585	1	1/21/12	301	5/16/12	7HO09420	2	116	P/185	43440	0.8		43440			142		78	0.9	\$3,684
3377	1658	1	8/6/12	103	10/21/12	7HO09893	1	76		42577	1.9		42577			146		131	1.3	\$3,571
3327	1608	1	3/14/12	248	6/11/12	7HO09229	2	89	P/159	42690	1.4		42690			567		109	0.9	\$3,468
3326	1607	1	4/15/12	216	7/20/12	7HO10176	2	96	P/120	41259	1.6		41259			340		112	1.5	\$3,156
3359	1640	1	6/4/12	166	10/24/12	7HO10091	2	142		42777	2.4		42777			20		125	2.2	\$3,130
3077	1358	2	1/25/12	297	11/10/12	7HO09471	6	290		39417	5.4	2404	39616	0.5	2404	318		128	3.9	\$278
3085	1367	2	7/15/12	125					N	33255	0.9	428	35944	4.6	428	71		131	1.2	\$276
2871	1154	3	1/14/12	DRY	3/25/12	7HO09052	1	71	P/237	33183	1	-913	34185	1.7	-76	344				\$273
3253	1534	2	10/28/12	20						31578	1.4	3517	34188	3.8	3517	285		119	1.4	\$273
3269	1550	1	1/22/12	DRY	3/31/12	7HO09420	1	69	P/231	34011	3.8		34011	3.8						\$270
3281	1562	1	2/4/12	287	4/15/12	7HO09165	1	71	P/216	33609	1.6		33609			185		59	1.9	\$269
2945	1228	3	9/25/12	53						27406	0.8	612	36670	1.9	226	194		115	1	\$265
3371	1652	1	8/19/12	90						33556	0.9		33556			124		100	0.8	\$256
3217	1499	2	10/8/12	40						17783	1.2	-6148	26926	3.3	-6148			47	1.1	(\$3,473)
3429	1710	1	10/29/12	19						23564	2.1		23564					53	2.1	(\$3,654)
3421	1702	1	10/30/12	18						19546	1.7		19546					34	1.7	(\$5,128)
3428	1709	1	10/11/12	37						19173	1.6		19173					41	0.8	(\$5,151)
3400	1681	1	10/18/12	30						18936	1.6		18936					41	1.6	(\$5,384)
3389	1670	1	10/18/12	30						17321	1.3		17321					34	1.3	(\$5,958)

Value of herd reproductive performance

How much gain when improving reproduction

Improve herd reproduction

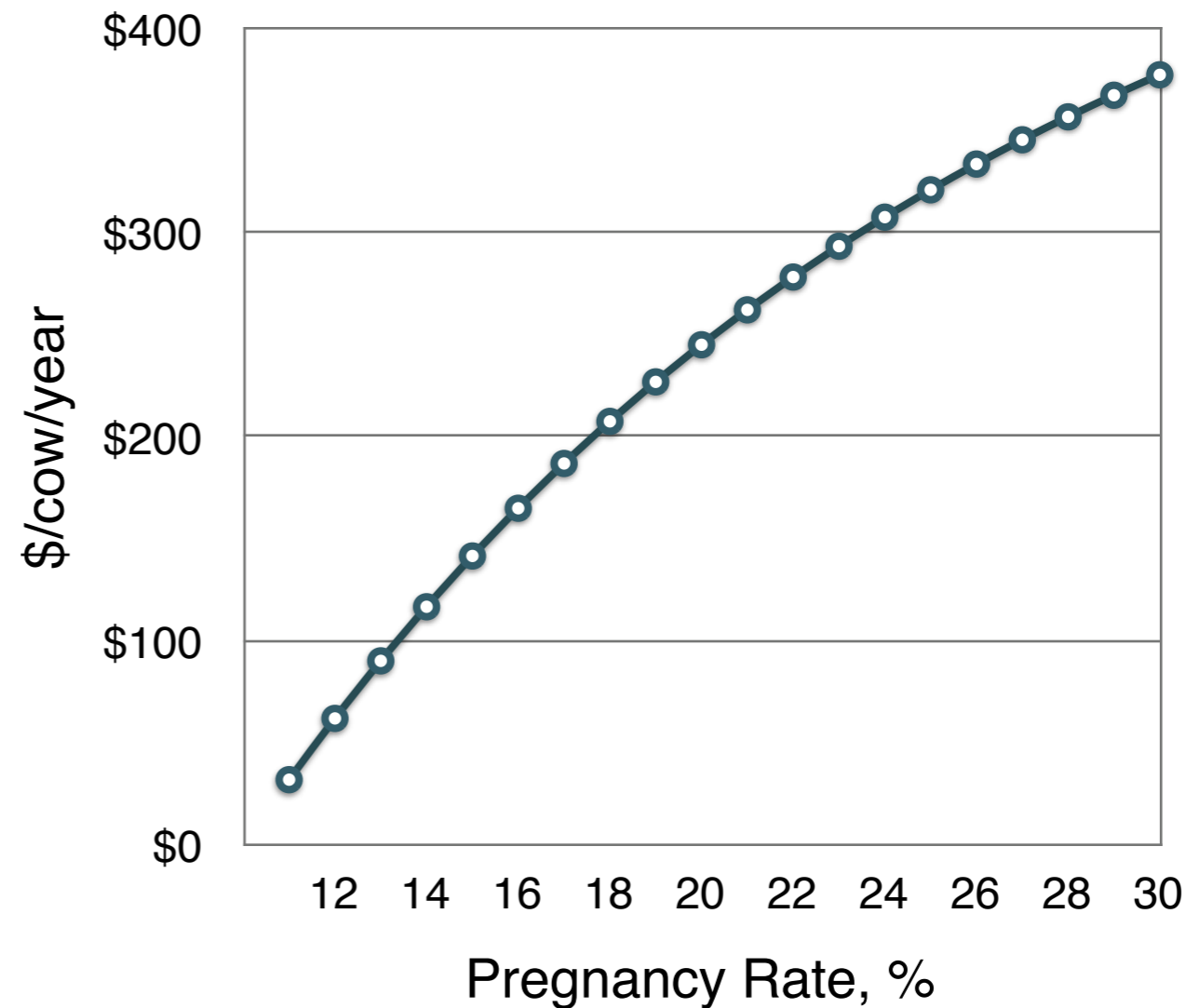
- Make more money!

How much is the gain

- Between \$32 and \$111 per cow per year

Net profit when increasing preg. rate 15 to 20%

- \$103 per cow per year



Individual cow reproductive management

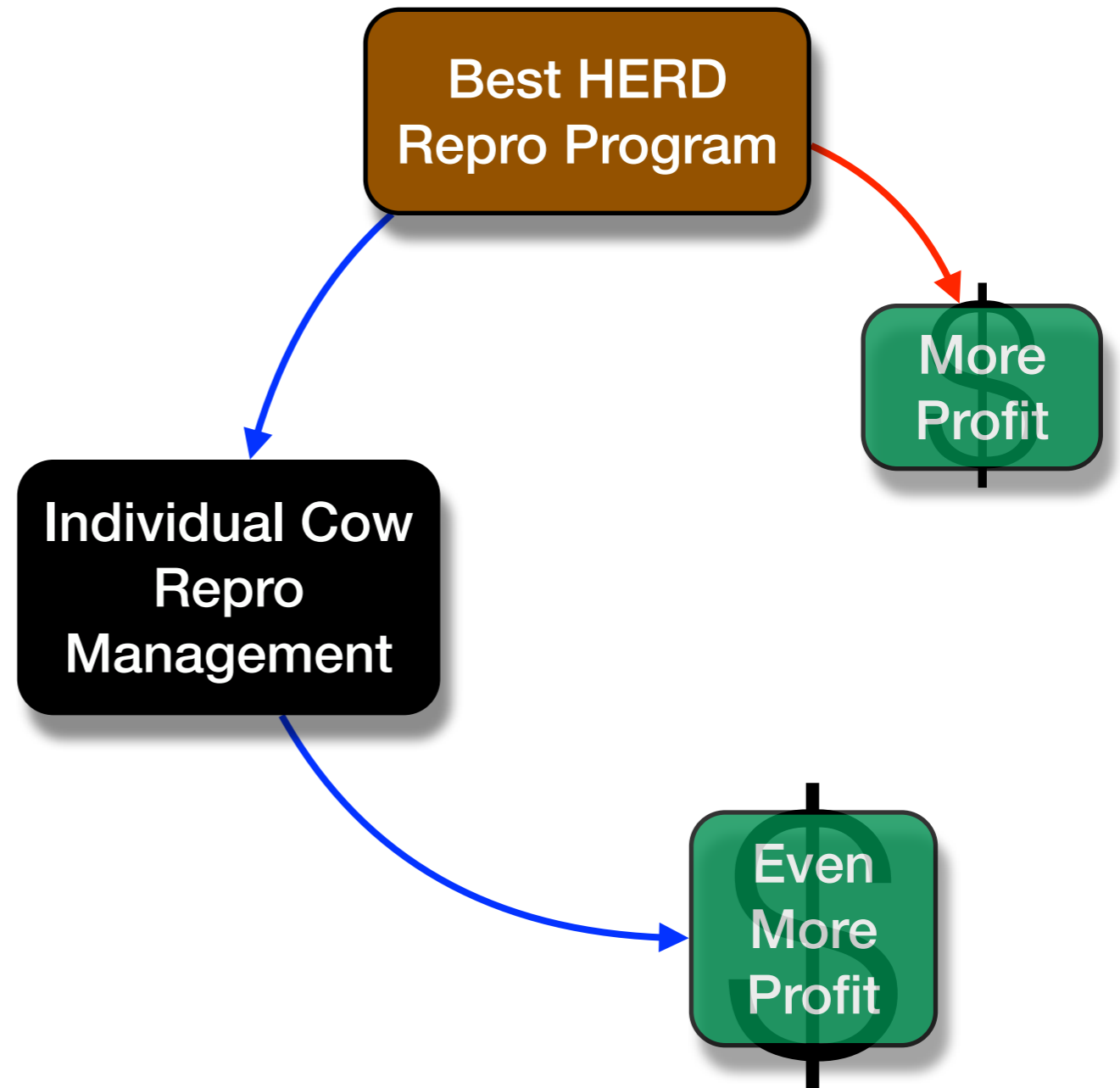
Optimal decision-making using tool: *Economic Value of a Dairy Cow Value*

High value cow

- Better quality semen
- Female sexed semen
- Give extra services
- If pregnant, special care
- ...

Low value cow

- Embryo transfer
- Lower quality semen
- Bull sexed semen
- Stop breeding earlier
- ...



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National Institute of Food and Agriculture

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Thanks