



# **Economic Impact of Dairy Cow Management**

**V.E. Cabrera**

University of Wisconsin-Madison Dairy Science

# DairyMGT.info

## UW-Dairy Management Website



### Dairy Management

Dairy Management site is designed to support dairy farming decision-making focusing on model-based scientific research. The ultimate goal is to provide user-friendly computerized decision support systems to help dairy farms improve their economic performance. Dr. Victor Cabrera focuses on model-based decision support in dairy cattle and in dairy farm production systems. Dr. Cabrera's primary interest is to improve cost-efficiency and profitability along with environmental stewardship in dairy farms by using simulation techniques, artificial intelligence, and expert systems. Dr. Cabrera's research and Extension programs involve interdisciplinary and participatory approaches towards the creation of user-friendly decision support systems. As an Extension Specialist, Dr. Cabrera works in close relationships with county-based Extension faculty, dairy producers, consultants, and related industry.

#### Opportunities

Ph.D. Student Opportunity - New!

#### Latest Projects

- Genomic Selection and Herd Management
- Dairy Reproduction Decision Support Tools
- Strategies of Pasture Supplementation
- Improving Dairy Cow Fertility
- LGM-Dairy

#### UW

- University of Wisconsin - Madison
- UW - Cooperative Extension
- UW - Dairy Science
- Understanding Dairy Markets
- UW Dairy Nutrient
- UW Center for Dairy Profitability

#### Dairy News

UW-Extension Dairy News

#### Helpful Link

Repro Money Program

#### Contact

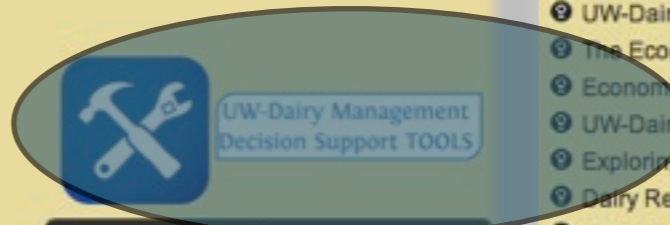


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Victor E. Cabrera, Ph.D.

#### Admin Portal

Click Above to reach the Administrator Portal.



**Tweets** Follow @vecabrera

**Victor E. Cabrera** @vecabrera 30 Jun  
Nice program for the 2014 International Cow Fertility Conference, Westport, Ireland. [fb.me/2hu6prvQf](#)

**Victor E. Cabrera** @vecabrera 27 Jun  
[fb.me/20nA7B1Bk](#)

Tweet to @vecabrera

#### Feeding

- FeedVal 2012
- Grouping Strategies for Feeding Lactating Dairy Cattle
- Optigen® Evaluator
- Income Over Feed Supplement Cost
- Dairy Extension Feed Cost Evaluator
- Corn Feeding Strategies
- Income Over Feed Cost
- Dairy Ration Feed Additive Break-Even Analysis

#### Heifers

- Heifer Pregnancy Rate
- Cost-Benefit of Accelerated Liquid Feeding Program for Dairy Calves
- Economic Value of Sexed Semen Programs for Dairy Heifers
- Heifer Replacement
- Heifer Break-Even

#### Reproduction

- UW-DairyRepro\$Plus: A Reproductive Analysis Tool that Includes Heat Detection Devices
- The Economic Value of a Dairy Cow
- Economic Value of Sexed Semen Programs for Dairy Heifers
- UW-DairyRepro\$: A Reproductive Economic Analysis Tool
- Exploring Timing of Pregnancy Impact on Income Over Feed Cost
- Dairy Reproductive Economic Analysis
- Heifer Pregnancy Rate

#### Production

- Milk Curve Fitter
- Decision Support System Program for Dairy Production and Expansion
- Economic Analysis of Switching from 2X to 3X Milking
- Lactation Benchmark Curves for Wisconsin
- Economic Evaluation of using rbST
- Alfalfa Yield Predictor: Using a Computer Application to Predict Irrigated Alfalfa Yield

#### Replacement

- The Economic Value of a Dairy Cow
- Value of a Springer
- Heifer Replacement

# Outline

120 minutes

## **The economic value of a dairy cow**

Rationale

Decision support tool

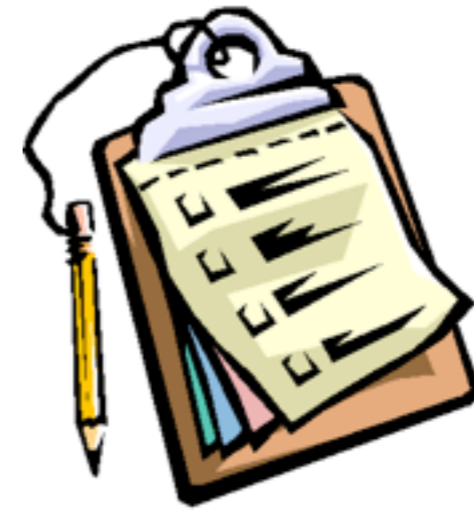
Applications

## **Livestock gross margin for dairy**

Rationale

Suite of decision support tools

Applications



## **FeedVal2012**

Decision support tool

Applications

## **Grouping strategies for lactating cows**

Rationale

Decision support tool

Applications



# Economic Value of a Dairy Cow

# Economic value of a dairy cow

What is it?

**Discounted future net return of a cow**

Compared to a replacement



Vs.

**Projected net return of a cow - projected net return of replacement**

Includes replacement transaction cost



# Economic value of a dairy cow

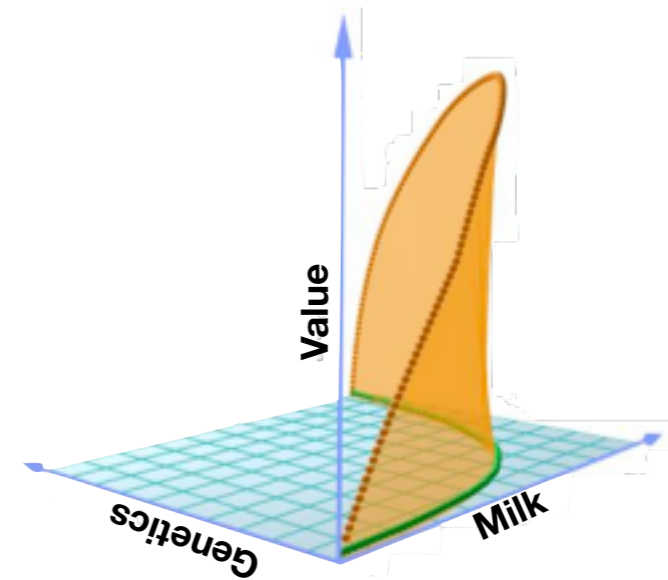
Variables with large impact

## Cow productivity in relation with herd mates

Current lactation  
Future lactations

## Replacement genetics

Expected genetic improvement with a replacement



# **Economic value of a dairy cow**

Critical economic implications

## **Optimal replacement management**

Keep or replace

## **Crucial decisions**

Breed or not breed

Use of special breeding options

## **Important information**

Value of a pregnancy

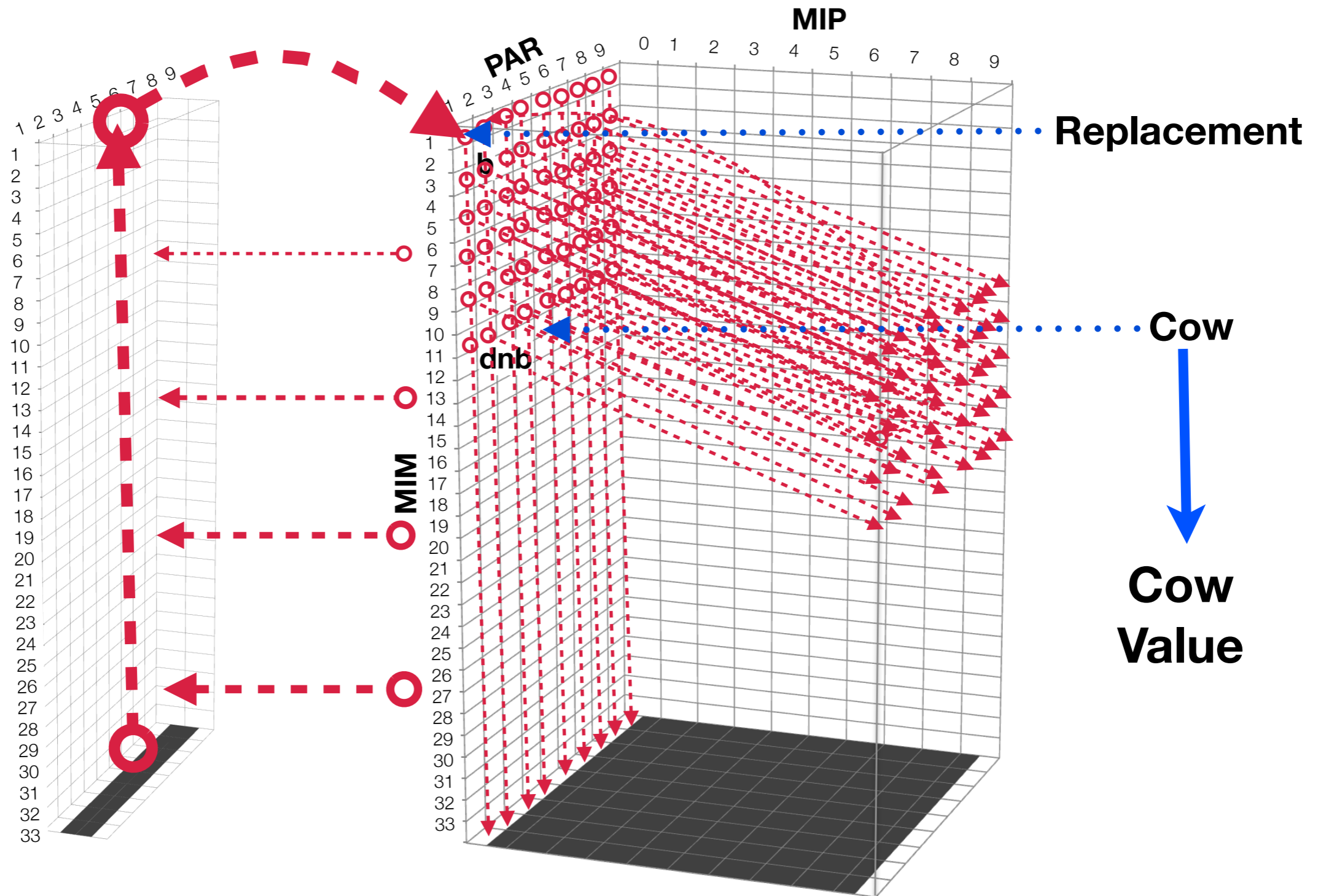
Cost of a pregnancy loss

Cost of a day open



# Basic principle of value of a cow

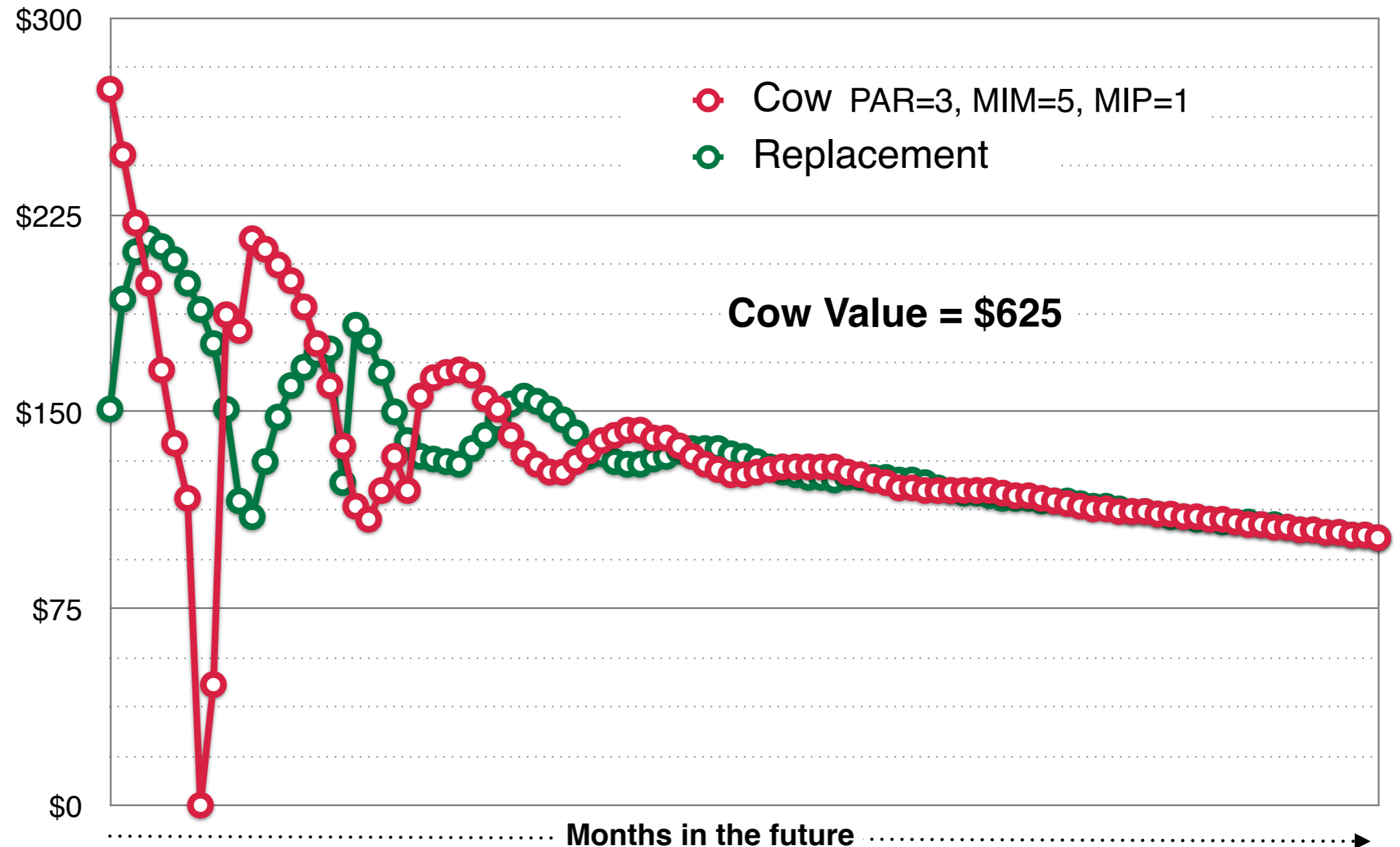
## Markov-chains







# Basic principle of value of a cow

## An application



# Calculating the value of a cow

## Decision support tool

 **The Economic Value of a Dairy Cow**   
Victor E. Cabrera, Department of Dairy Science

Overview **Single Cow Analysis** Herd Analysis  US English  US Metric  UK

**INPUTS - Edit Values in This Block**

**Evaluated Cow Variables**

Current Lactation	2
Current Months after Calving	1
Current Months in Pregnancy	0
Expected Milk Production Rest of Lactation, %	100
Expected Milk Production Next Lactations, %	100

**Replacement Cow Variable**

Expected genetic improvement, % additional milk	0
---	---

**Herd Production and Reproduction Variables**

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

**Herd Economic Variables**

Replacement Cost, \$/cow	1300
Salvage Value, \$/lb live weight	0.38
Calf Value, \$/calf	100
Milk Price, \$/cwt	15.88
Milk Butterfat, %	3.5
Feed Cost Lactating Cows, \$/lb dry matter	0.1
Feed Cost Dry Cows, \$/lb dry matter	0.08
Interest Rate, %/year	6

Analyze

**OUTPUTS - Interactive Results**

**Value of the Cow, \$** **897**

**Compared Against a Replacement, \$**

Milk Sales, \$	535
Feed Cost, \$	-238
Calf Value, \$	-2
Non-reproductive Cull, \$	-85
Mortality Cost, \$	-16
Reproductive Cull, \$	4
Reproduction Costs, \$	-5
Replacement Transaction, \$	704

**Herd Structure at Steady State**

Days in milk	224
Days to Conception	122
Percent of Pregnant	52
Reproductive Culling, %	8
Mortality, %	3
1st Lactation, %	43
2nd Lactation, %	27
> 3rd Lactation, %	30

**Economics of an Average Cow, \$/year**

Net Return, \$	1969
Milk Sales, \$	3806
Feed Cost, \$	-1522
Calf Sales, \$	60
Non-Reprod. Culling Cost, \$	-198
Mortality Cost, \$	-38
Reproductive Culling Cost, \$	-59
Reproductive Cost, \$	-80

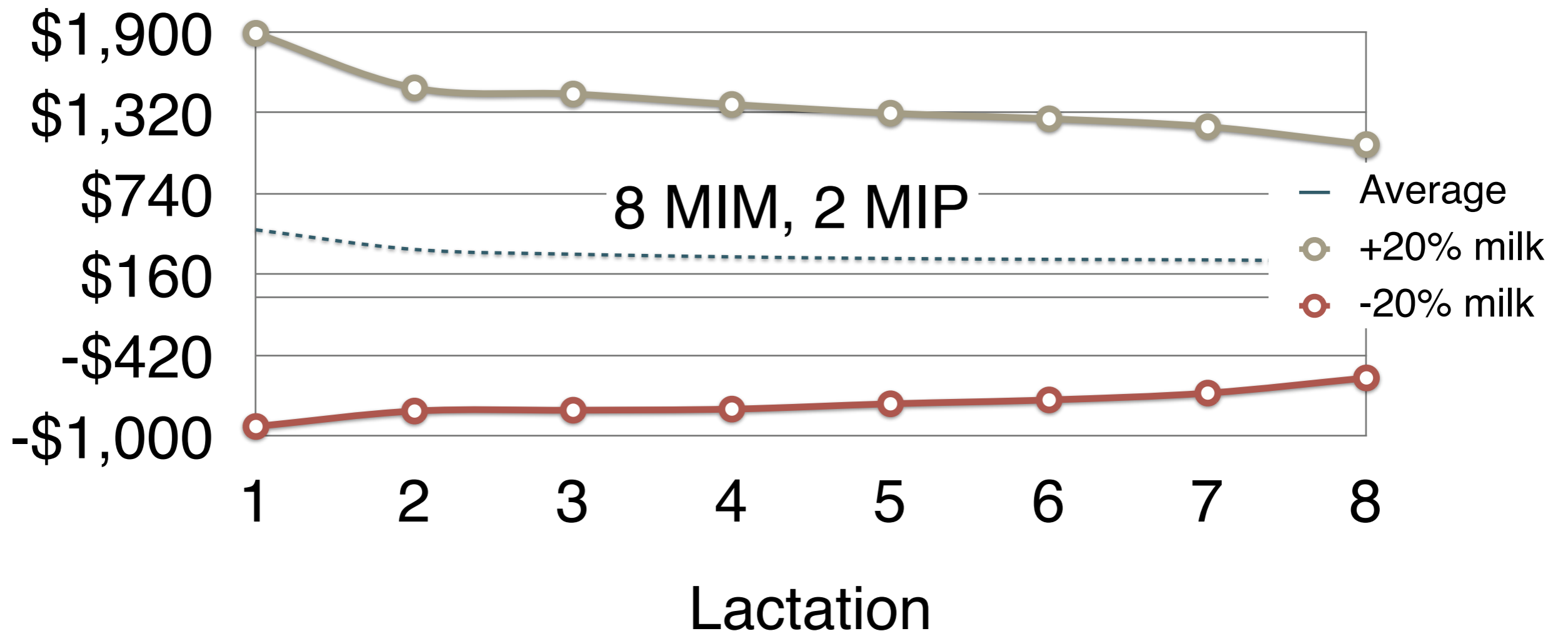
**Example:**  
Value of this 2<sup>nd</sup> lactation, 1 MIM, open cow is **\$897**

# Economic value of a dairy cow

## Practical decision-making

### Cull or not cull

Positive cow value indicates cow brings more value than replacement

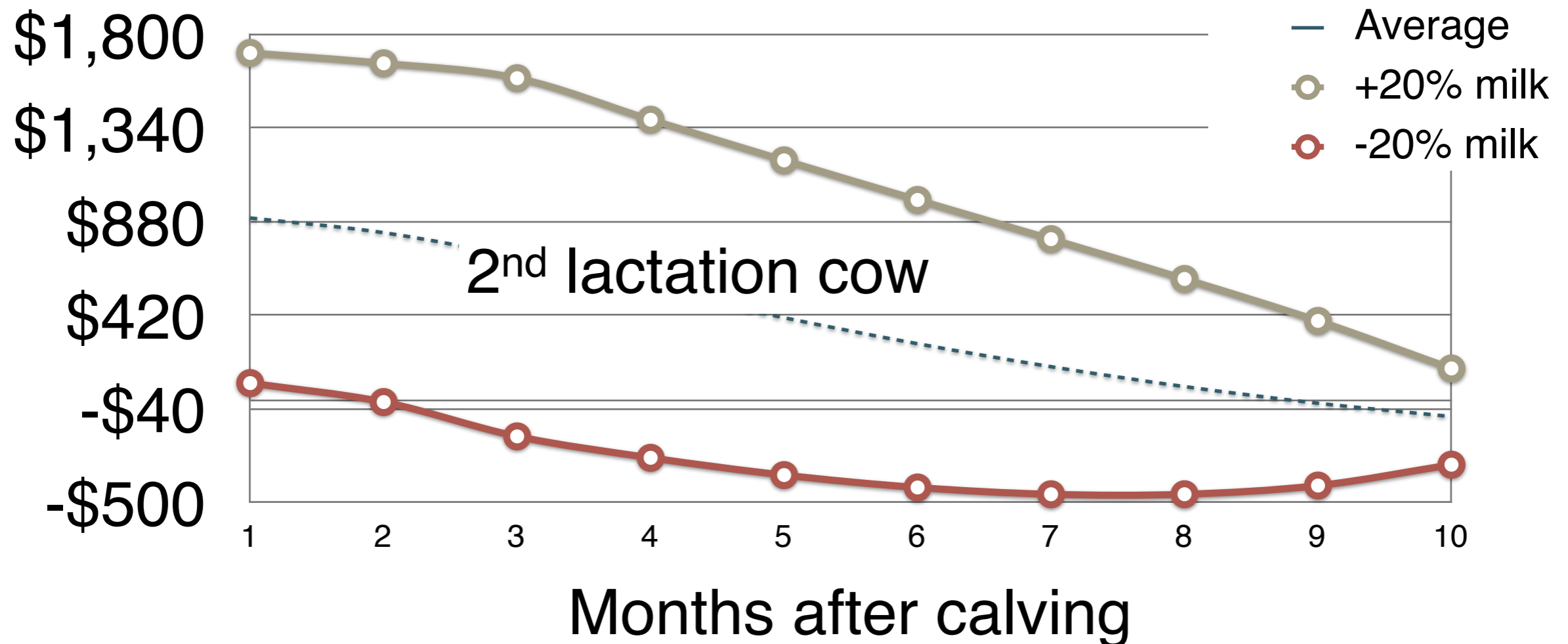


# Economic value of a dairy cow

Practical decision-making

## Breed or not breed

Better chance for higher value cows

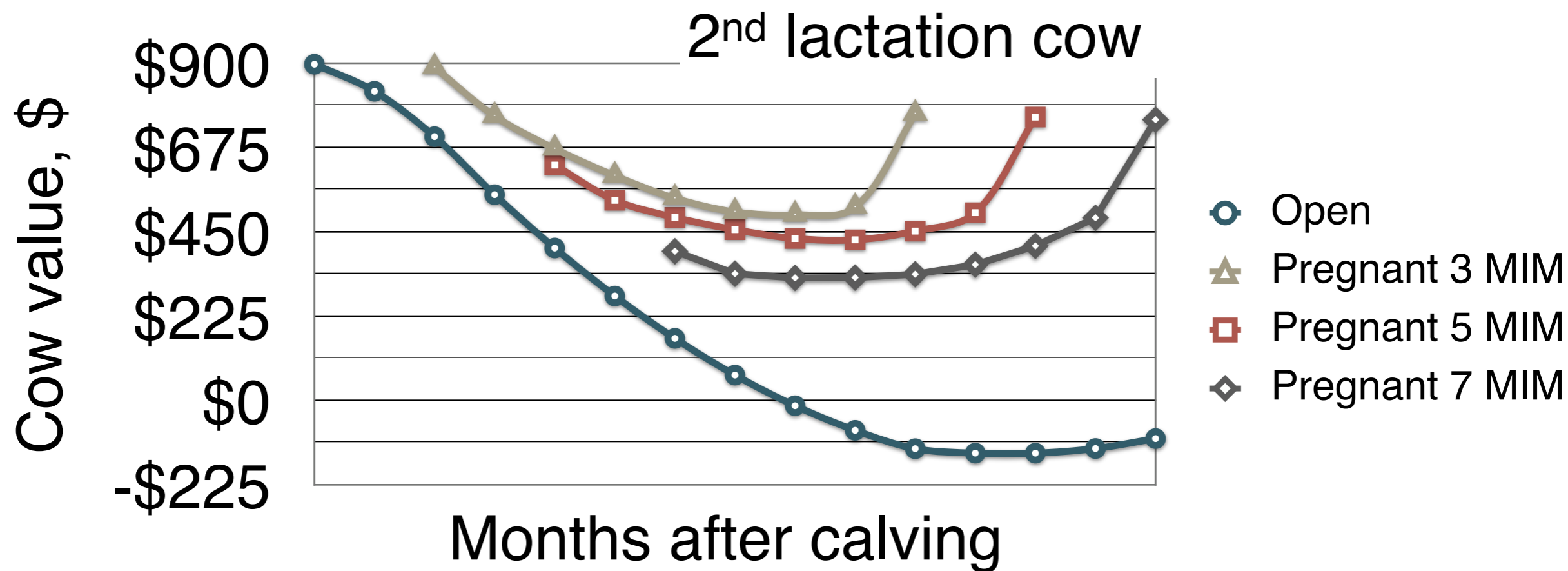


# Economic value of a dairy cow

## Practical decision-making

### Treat or not treat

More investment allowed  
in higher value cows

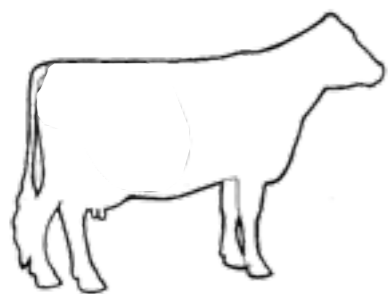


# Economic value of a dairy cow

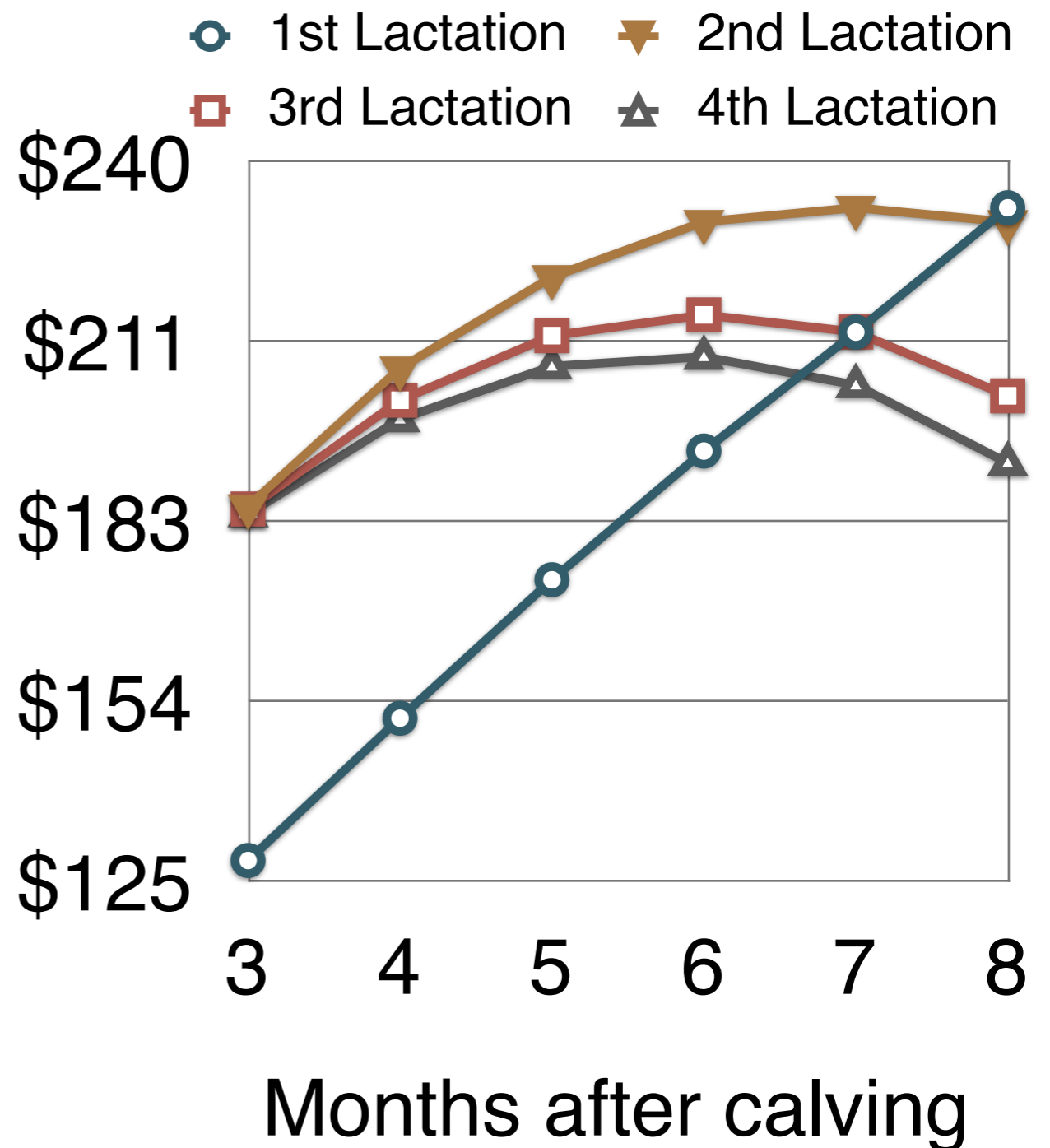
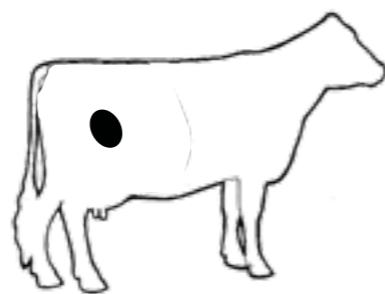
## Practical decision-making

### Calculate the value of a pregnancy

Difference between pregnant and non-pregnant



vs.

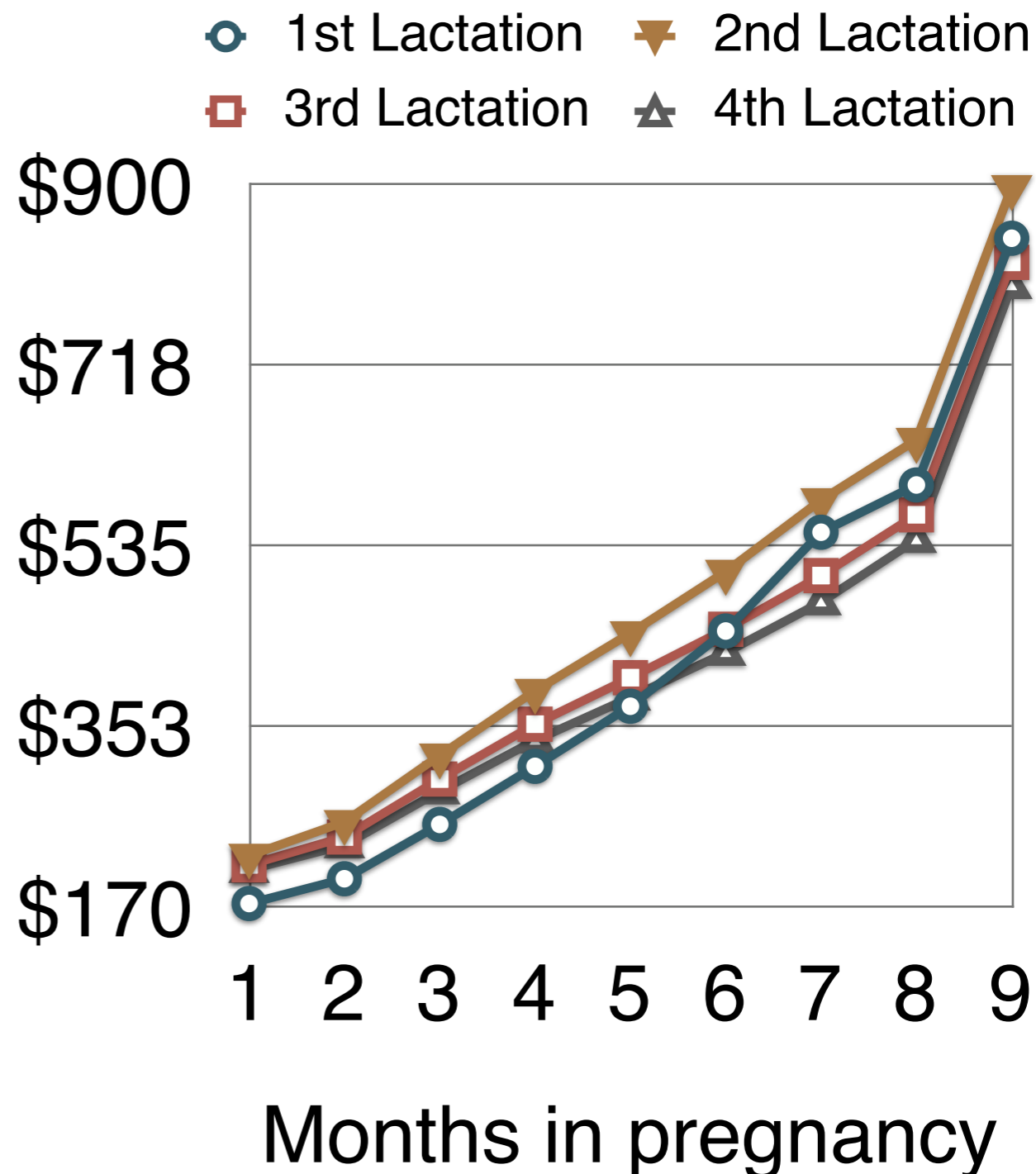
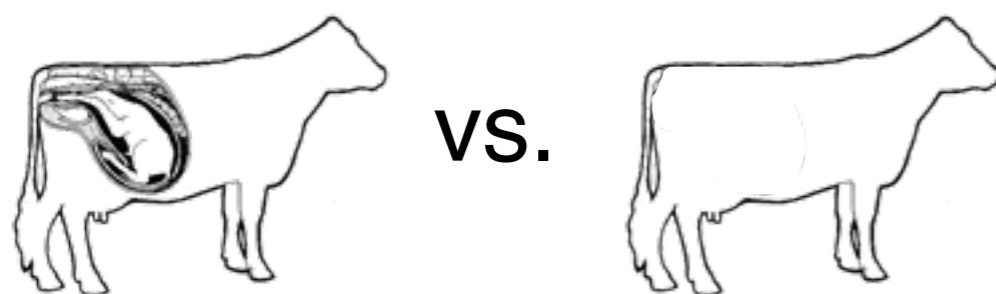


# Economic value of a dairy cow

## Practical decision-making

### Calculate the cost of a pregnancy loss

Difference between non-pregnant and pregnant

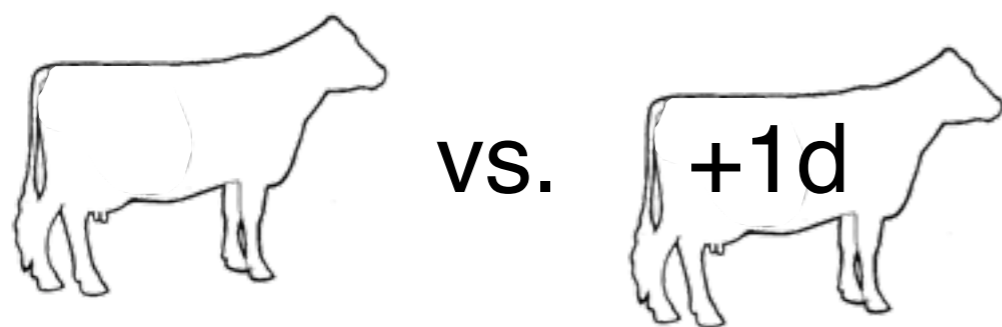


# Economic value of a dairy cow

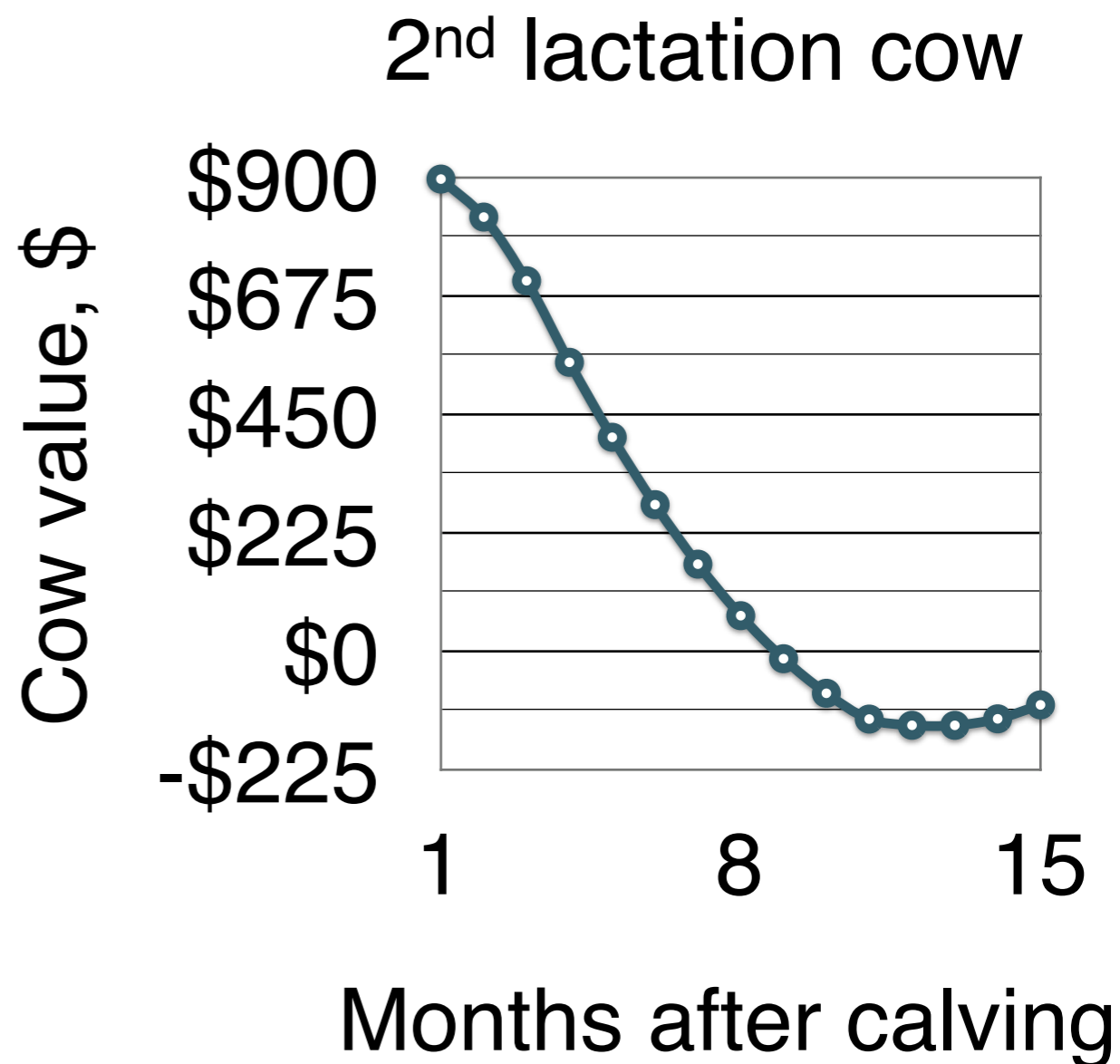
## Practical decision-making

### 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)





# Economic value all cows in herd

Ranked values for better decision-making

## Herd's individual cow values

Candidates for replacement

Best performing animals

Treatment decisions

Cow ID	Cow value, \$
5892	-1,123
6344	-243
435	-10
▲▲▲▲▲	
221	269
5543	2,213





# Livestock Gross Margin for Dairy

# Livestock gross margin for dairy

Price risk management insurance

## Protects gross margin

Income over feed cost

## Bundled price risk management

Floor milk price +  
ceiling feed prices

## Prices from CME

Class III

Corn

Soybean meal

## 10-month cycles

1 month skipped

Planning 11 months future

## Re-insured

USDA Risk Management  
Agency

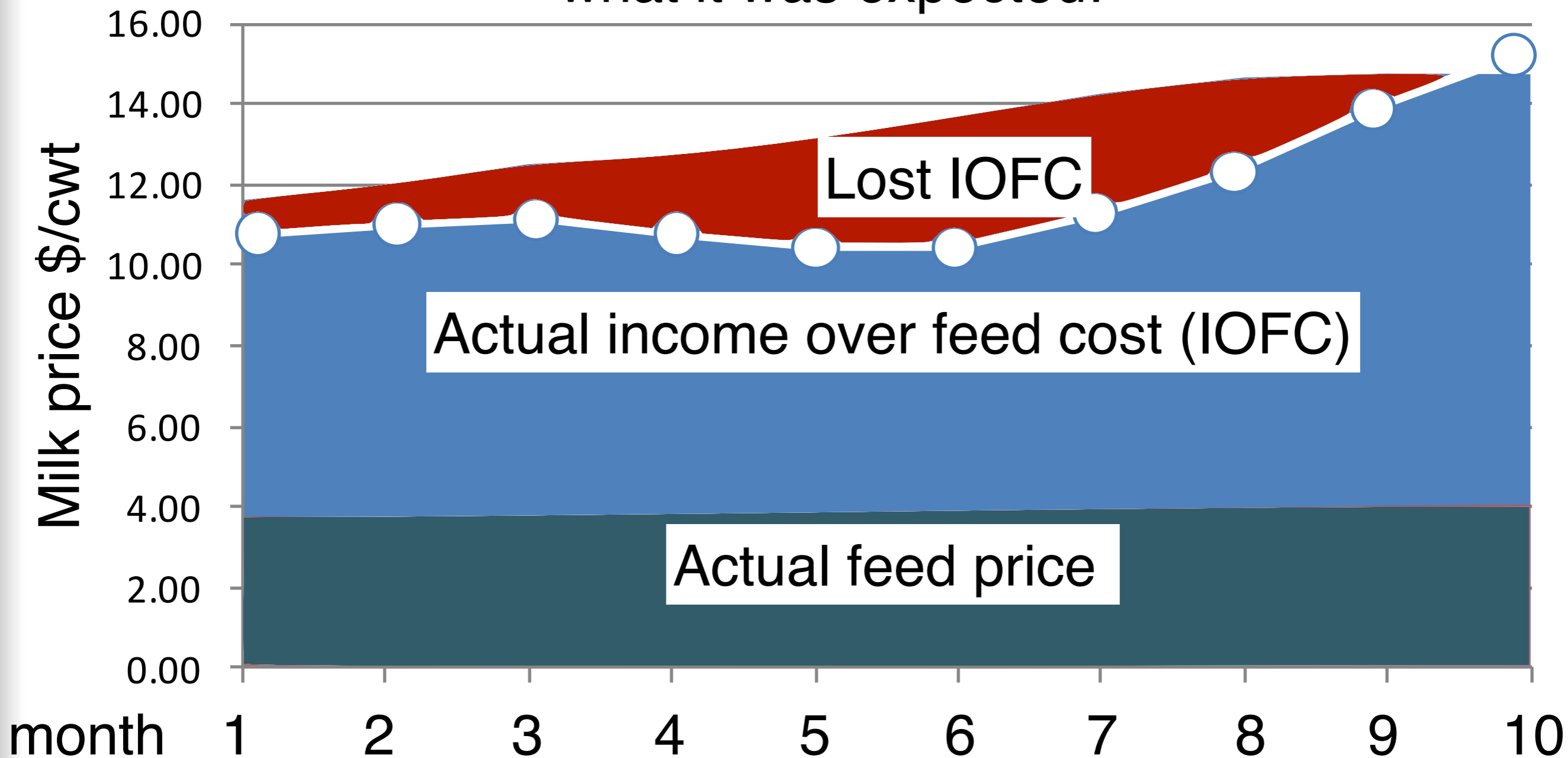
## Monthly selling

Premium subsidy  
available

# Livestock gross margin for dairy

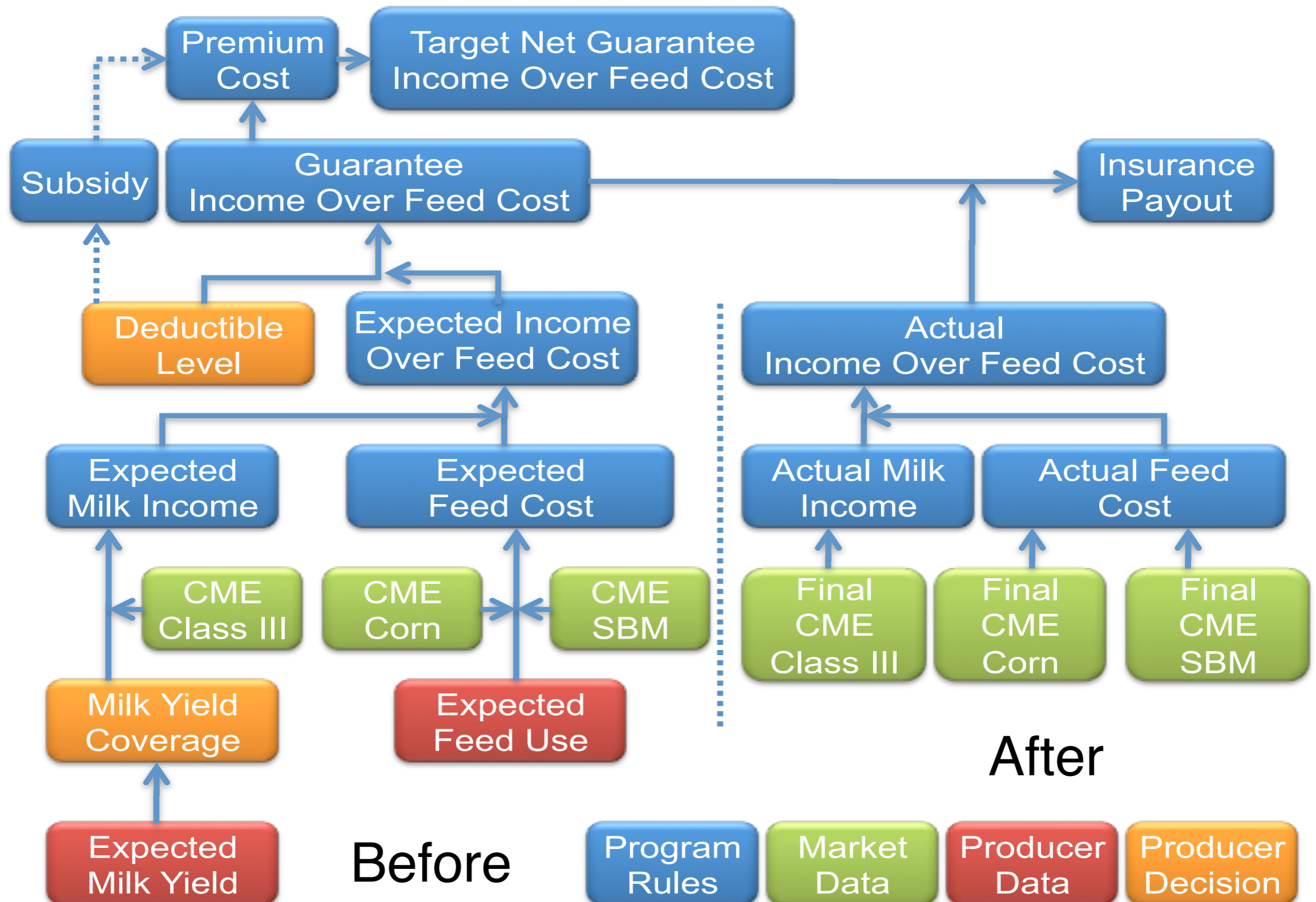
## Price risk management insurance

Milk price was lower than what it was expected!



# Livestock gross margin for dairy

How it works?



# Livestock gross margin for dairy

## Premium estimator

The prices we use for the Gross Margin Calculation correspond to future and option prices retrieved on the trade dates: **2013-07-03, 2013-07-05, 2013-07-08**

✓ Coverage Month	Production (cwt)		Corn Equiv (tons)		Soybean Meal Equiv (tons)		% covered	Monthly Gross Margin		
	Month Year	Milk Qty.	Covered Milk × Expected Price = Milk Revenue	Corn Qty.	Covered Corn × Expected Price = Corn Cost	SBM Qty.		Covered SBM × Expected Price = SBM Cost	Milk Revenue - Corn Cost - SBM Cost - (Deductible × Milk Qty.)	\$/cwt of Farm Milk
✓ Sep 2013	4113	1,934 cwt × \$18.52/cwt = \$35,824	95.8	45.1 tons × \$5.30/bu = \$8,528	21.1	9.9 tons × \$393.39/ton = \$3,904	47.03	21,458	5.22	11.09
✓ Oct 2013	4340	2,041 cwt × \$18.48/cwt = \$37,719	101.1	47.5 tons × \$5.19/bu = \$8,819	22.3	10.5 tons × \$366.99/ton = \$3,849	47.03	23,010	5.30	11.27
✓ Nov 2013	4188	1,970 cwt × \$18.18/cwt = \$35,807	97.6	45.9 tons × \$5.09/bu = \$8,338	21.5	10.1 tons × \$365.90/ton = \$3,700	47.03	21,799	5.21	11.07
✓ Dec 2013	4240	1,994 cwt × \$17.82/cwt = \$35,534	98.8	46.5 tons × \$4.98/bu = \$8,264	21.8	10.3 tons × \$364.82/ton = \$3,740	47.03	21,535	5.08	10.80
✓ Jan 2014	4188	1,970 cwt × \$17.33/cwt = \$34,133	97.6	45.9 tons × \$5.02/bu = \$8,229	21.5	10.1 tons × \$366.12/ton = \$3,702	47.03	20,232	4.83	10.27
✓ Feb 2014	4023	1,892 cwt × \$17.15/cwt = \$32,447	93.7	44.1 tons × \$5.06/bu = \$7,963	20.7	9.7 tons × \$366.83/ton = \$3,571	47.03	19,021	4.73	10.05
✓ Mar 2014	4075	1,916 cwt × \$17.09/cwt = \$32,752	94.9	44.6 tons × \$5.10/bu = \$8,129	20.9	9.8 tons × \$367.55/ton = \$3,613	47.03	19,094	4.69	9.96
✓ Apr 2014	4038	1,899 cwt × \$17.12/cwt = \$32,511	94.1	44.3 tons × \$5.14/bu = \$8,123	20.8	9.8 tons × \$367.30/ton = \$3,593	47.03	18,896	4.68	9.95
✓ May 2014	4063	1,911 cwt × \$17.20/cwt = \$32,865	94.7	44.5 tons × \$5.18/bu = \$8,239	20.9	9.8 tons × \$367.05/ton = \$3,608	47.03	19,108	4.70	10.00
✓ Jun 2014	4149	1,951 cwt × \$17.19/cwt = \$33,541	96.7	45.5 tons × \$5.21/bu = \$8,470	21.3	10.0 tons × \$368.03/ton = \$3,687	47.03	19,434	4.68	9.96
Total	Farm	41,417 cwt	965 tons	213 tons	47.03%	GMG 203,588	4.92	10.45		
	Covered	19,478 cwt	454 tons	100 tons						
	Weighted Avg Price	17.62 \$/cwt	5.13 \$/bu	369.37 \$/tons						

# Livestock gross margin for dairy

## Premium estimator

Deductible Level (\$/cwt)	Total Premium (\$)	Subsidized Premium (\$)	GMG (\$)	Net GMG (\$)	Prob. of Payout (%)	Net Premium as % of GMG (%)	% Net Prem. change	% GMG Change
0.0	13,616	11,165	223,066	211,901	50	5.01	-	-
0.1	12,627	10,228	221,118	210,890	48	4.63	-8.39	-0.87
0.2	11,688	9,234	219,170	209,936	45	4.21	-17.30	-1.75
0.3	10,799	8,316	217,222	208,907	43	3.83	-25.52	-2.62
0.4	9,956	7,467	215,275	207,808	41	3.47	-33.12	-3.49
0.5	9,157	6,593	213,327	206,734	38	3.09	-40.95	-4.37
0.6	8,402	5,797	211,379	205,582	36	2.74	-48.08	-5.24
0.7	7,687	5,073	209,431	204,358	34	2.42	-54.56	-6.11
0.8	7,012	4,348	207,483	203,136	32	2.10	-61.06	-6.99
0.9	6,377	3,826	205,535	201,709	30	1.86	-65.73	-7.86
<b>1.0</b>	<b>5,778</b>	<b>3,004</b>	<b>203,588</b>	<b>200,583</b>	<b>29</b>	<b>1.48</b>	<b>-73.09</b>	<b>-8.73</b>
1.1	5,217	2,609	201,640	199,031	26	1.29	-76.64	-9.61
1.2	4,699	2,349	199,692	197,343	24	1.18	-78.96	-10.48
1.3	4,219	2,110	197,744	195,634	23	1.07	-81.11	-11.35
1.4	3,776	1,888	195,796	193,908	21	0.96	-83.09	-12.22
1.5	3,376	1,688	193,848	192,160	18	0.87	-84.88	-13.10
1.6	3,012	1,506	191,900	190,394	17	0.78	-86.51	-13.97
1.7	2,678	1,339	189,953	188,614	15	0.70	-88.01	-14.84
1.8	2,374	1,187	188,005	186,818	14	0.63	-89.37	-15.72
1.9	2,096	1,048	186,057	185,009	13	0.56	-90.61	-16.59
2.0	1,846	923	184,109	183,186	11	0.50	-91.73	-17.46

Unit	Premium	GMG	Net GMG
Total (\$)	3,004	203,588	200,583
Per cwt of Farm Milk (\$/cwt)	0.07	4.92	4.84
Per cwt of Covered Milk (\$/cwt)	0.15	10.45	10.30

# Livestock gross margin for dairy

## Optimize the level of coverage

Target NIOFC: \$ **5.0** /cwt

The prices we use for the Gross Margin Calculation correspond to future and option prices retrieved on the trade dates: **2013-07-03, 2013-07-05, 2013-07-08**

Coverage Month	Production (cwt)		Corn Equiv (tons)		Soybean Meal Equiv (tons)		% covered	Monthly Gross Margin		
	Month Year	Milk Qty.	Covered Milk × Expected Price = Milk Revenue	Corn Qty.	Covered Corn × Expected Price = Corn Cost	SBM Qty.		Covered SBM × Expected Price = SBM Cost	Milk Revenue - Corn Cost - SBM Cost - (Deductible × Milk Qty.)	\$/cwt of Farm Milk
✓ Sep 2013	4113	4,113 cwt × \$18.52/cwt = \$76,172	95.8	95.8 tons × \$5.30/bu = \$18,133	21.1	21.1 tons × \$393.39/ton = \$8,301	100	45,625	11.09	11.09
✓ Oct 2013	4340	4,340 cwt × \$18.48/cwt = \$80,202	101.1	101.1 tons × \$5.19/bu = \$18,751	22.3	22.3 tons × \$366.99/ton = \$8,184	100	48,927	11.27	11.27
✓ Nov 2013	4188	4,188 cwt × \$18.18/cwt = \$76,137	97.6	97.6 tons × \$5.09/bu = \$17,730	21.5	21.5 tons × \$365.90/ton = \$7,867	100	46,352	11.07	11.07
✓ Dec 2013	4240	0 cwt × \$17.82/cwt = \$0	98.8	0.0 tons × \$4.98/bu = \$0	21.8	0.0 tons × \$364.82/ton = \$0	0	0	NA	NA
✓ Jan 2014	4188	1,378 cwt × \$17.33/cwt = \$23,878	97.6	32.1 tons × \$5.02/bu = \$5,757	21.5	7.1 tons × \$366.12/ton = \$2,590	32.9	14,154	3.38	10.27
✓ Feb 2014	4023	1,569 cwt × \$17.15/cwt = \$26,907	93.7	36.5 tons × \$5.06/bu = \$6,603	20.7	8.1 tons × \$366.83/ton = \$2,961	39	15,773	3.92	10.05
✓ Mar 2014	4075	0 cwt × \$17.09/cwt = \$0	94.9	0.0 tons × \$5.10/bu = \$0	20.9	0.0 tons × \$367.55/ton = \$0	0	0	NA	NA
✓ Apr 2014	4038	662 cwt × \$17.12/cwt = \$11,337	94.1	15.4 tons × \$5.14/bu = \$2,833	20.8	3.4 tons × \$367.30/ton = \$1,253	16.4	6,589	1.63	9.95
✓ May 2014	4063	61 cwt × \$17.20/cwt = \$1,048	94.7	1.4 tons × \$5.18/bu = \$263	20.9	0.3 tons × \$367.05/ton = \$115	1.5	609	0.15	10.00
✓ Jun 2014	4149	3,166 cwt × \$17.19/cwt = \$54,417	96.7	73.8 tons × \$5.21/bu = \$13,741	21.3	16.3 tons × \$368.03/ton = \$5,981	76.3	31,529	7.60	9.96
Total	Farm	41,417 cwt	965 tons	213 tons	47.03%	GMG 209,559	5.06	10.76		
	Covered	19,477 cwt	454 tons	100 tons						
	Weighted Avg Price	17.98 \$/cwt	5.17 \$/bu	372.43 \$/tons						



# Livestock gross margin for dairy

Optimize the level of coverage

## Optimized

Unit	Premium	GMG	Net GMG
Total (\$)	2,450	209,535	207,085
Per cwt of Farm Milk (\$/cwt)	0.06	5.06	5.00
Per cwt of Covered Milk (\$/cwt)	0.13	10.76	10.63

vs.

## Naïve 47% coverage

Unit	Premium	GMG	Net GMG
Total (\$)	3,004	203,588	200,583
Per cwt of Farm Milk (\$/cwt)	0.07	4.92	4.84
Per cwt of Covered Milk (\$/cwt)	0.15	10.45	10.30

	Optimized	Naïve	Gain
Total premium, \$	2,450	3,004	554
Premium, \$/cwt	0.06	0.07	0.01
Net guaranteed IOFC, \$	207,085	200,583	6,502



**FeedVal2012**

# FeedVal2012 concept

What is FeedVal?

## Decision support tool

Assess the true value of feed ingredients



## Assists in the management of

Purchasing feeds  
Use available feeds  
Formulate diets

## Helps economical decision-making

Producers  
Nutritionists  
Lenders

# FeedVal2012

Upload data as Excel file:  no file selected

Disregard negative Nutrient Calculated Values

Select Number of Nutrients:

## Commands

### INPUTS - Nutrients for Ingredients

Ingredient	Nutrient					
	RUP %	RDP %	NE13x M	Lipid %	peNDF	Ca %
	Nutrient Calculated Value, \$/Unit DM					
Shelled Corn	4.5	4.5	0.91	4.2	0	0.04
Soybean Meal 48%	21	33	1	1.1	0	0.35
Soybean Meal 44%	17.5	32.5	0.97	1.6	0	0.4
Soybean Meal, expeller	30	16	1.09	8	0	0.36
Soybeans, dry	12	28	1.25	19	0	0.32
Soybeans, heated	22	21	1.24	19	0	0.26
Good Quality Hay	6	14	0.6	2	35	1.3
Poor Quality Hay	4.8	11.2	0.5	2	50	1
Corn Silage	2.8	4.2	0.67	3.2	30	0.27
Distillers Dried Grains	15	15	0.9	12	0	0.22
High-Moisture Corn	3.6	5.4	0.95	4.2	0	0.03
Tallow	0	0	2.06	100	0	0
Blood Meal	76	19	1.06	1.2	0	0.3
Urea	0	287	0	0	0	0
Straw	4	1	0.45	0.37	75	0.31
Soy Hulls	6	8	0.67	2.7	0	0.63
Corn Gluten Feed	7.5	16.5	0.79	3.5	0	0.7
Canola Meal, expeller	17	21	0.8	5.4	0	0.75
Canola Meal, solvent	13.5	24.5	0.74	1.5	0	0.75

## Nutrients

## Nutrient Content of Feed Ingredients

Feed Ingredients

### INPUTS - Price Inputs

As-Fed Basis		
DM %	Price \$/Unit	Unit
89	7.58	bu
89	462	ton
89	415.60	ton
92	439	ton
87	450	ton
92	700	ton
87	260	ton
87	201	ton
35	60	ton
89	260	ton
70	200	ton
99	25	cwt
94	968	ton
99	500	ton
85	140	ton
89	225	ton
89	242	ton
89	325	ton
89	400	ton

Prices of Feed Ingredients

### OUTPUTS

Calculated	
Predicted Value, \$/Unit	Actual Price as % of Predicted Value

Results

# FeedVal2012

1

Select number of nutrients

Upload data as Excel file:  no file selected

Analyze  Disregard negative values

Select Number of Nutrients:  6

2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13

-INPUTS - Nutrients for Ingredients-							-INPUTS - Price Inputs-			-OUTPUTS-	
Ingredient	Nutrient						As-Fed Basis			Calculated	
	CP %	RDP %	NE13x M	Lipid %	peNDF	Ca %	DM %	Price \$/Unit	Unit	Predicted Value, \$/Unit	Actual Price as % of Predicted Value
<input checked="" type="checkbox"/> Shelled Corn	4.5	4.5	0.91	4.2	0	0.04	89	7.58	bu		
<input checked="" type="checkbox"/> Soybean Meal 48%	21	33	1	1.1	0	0.35	89	462.7	ton		
<input checked="" type="checkbox"/> Soybean Meal 44%	17.5	32.5	0.97	1.6	0	0.4	89	415.60	ton		
<input checked="" type="checkbox"/> Soybean Meal, expeller	30	16	1.09	8	0	0.36	92	439.15	ton		
<input checked="" type="checkbox"/> Soybeans, raw	12	28	1.25	19	0	0.32	87	450	ton		
<input checked="" type="checkbox"/> Soybeans, heated	22	21	1.24	19	0	0.26	92	700	ton		
<input checked="" type="checkbox"/> Good Quality Hay	6	14	0.6	2	35	1.3	87	260	ton		
<input checked="" type="checkbox"/> Poor Quality Hay	4.8	11.2	0.5	2	50	1	87	201	ton		
<input checked="" type="checkbox"/> Corn Silage	2.8	4.2	0.67	3.2	30	0.28	35	60	ton		
<input checked="" type="checkbox"/> Distillers Dried Grains	15	15	0.9	12	0	0.22	89	260	ton		
<input checked="" type="checkbox"/> High-Moisture Corn	3.6	5.4	0.95	4.2	0	0.03	70	200	ton		
<input checked="" type="checkbox"/> Tallow	0	0	2.06	100	0	0	99	25	cwt		
<input checked="" type="checkbox"/> Blood Meal	76	19	1.06	1.2	0	0.3	94	968	ton		
<input checked="" type="checkbox"/> Urea	0	287	0	0	0	0	99	500	ton		
<input checked="" type="checkbox"/> Straw	4	1	0.45	0.37	75	0.31	85	140	ton		
<input checked="" type="checkbox"/> Soy Hulls	6	8	0.67	2.7	0	0.63	89	225	ton		
<input checked="" type="checkbox"/> Corn Gluten Feed	7.5	16.5	0.79	3.5	0	0.7	89	242	ton		
<input checked="" type="checkbox"/> Canola Meal, expeller	17	21	0.8	5.4	0	0.75	89	325	ton		
<input checked="" type="checkbox"/> Canola Meal, solvent	13.5	24.5	0.74	1.5	0	0.75	89	400	ton		

# FeedVal2012

2

Select combination of nutrients

Upload data as Excel file:  no file selected

Analyze  Disregard negative Nutrient Calculated Values

Select Number of Nutrients: 6

INPUTS - Nutrients for Ingredients							INPUTS - Price Inputs			OUTPUTS	
Ingredient	Nutrient						As-Fed Basis			Calculated	
	RUP %	NE13x Mcal/lb	Lipid %	peNDF %	Ca %		DM %	Price \$/Unit	Unit	Predicted Value, \$/Unit	Actual Price as % of Predicted Value
Shelled Corn	0.91	4.2	0	0.04		89	7.58	bu			
Soybean Meal 48%	1	1.1	0	0.35		89	462.7	ton			
Soybean Meal 44%	0.97	1.6	0	0.4		89	415.60	ton			
Soybean Meal, expeller	1.09	8	0	0.36		92	439.15	ton			
Soybeans, raw	1.25	19	0	0.32		87	450	ton			
Soybeans, heated	1.24	19	0	0.26		92	700	ton			
Good Quality Hay	6	14	0.6	2	35	1.3	87	260	ton		
Poor Quality Hay	4.8	11.2	0.5	2	50	1	87	201	ton		
Corn Silage	2.8	4.2	0.67	3.2	30	0.28	35	60	ton		
Distillers Dried Grains	15	15	0.9	12	0	0.22	89	260	ton		
High-Moisture Corn	3.6	5.4	0.95	4.2	0	0.03	70	200	ton		
Tallow	0	0	2.06	100	0	0	99	25	cwt		
Blood Meal	76	19	1.06	1.2	0	0.3	94	968	ton		
Urea	0	287	0	0	0	0	99	500	ton		
Straw	4	1	0.45	0.37	75	0.31	85	140	ton		
Soy Hulls	6	8	0.67	2.7	0	0.63	89	225	ton		
Corn Gluten Feed	7.5	16.5	0.79	3.5	0	0.7	89	242	ton		
Canola Meal, expeller	17	21	0.8	5.4	0	0.75	89	325	ton		
Canola Meal, solvent	13.5	24.5	0.74	1.5	0	0.75	89	400	ton		

# FeedVal2012

3

Select ingredients

Upload data as Excel file:  no file selected

Disregard negative Nutrient Calculated Values

Select Number of Nutrients:

INPUTS - Nutrients for Ingredients							INPUTS - Price Inputs			OUTPUTS	
Ingredient	Nutrient						As-Fed Basis			Calculated	
	RUP %	RDP %	NE13x M	Lipid %	peNDF	Ca %	DM %	Price \$/Unit	Unit	Predicted Value, \$/Unit	Actual Price as % of Predicted Value
<input checked="" type="checkbox"/> Shelled Corn	4.5	4.5	0.91	4.2	0	0.04	89	7.88	bu		
<input checked="" type="checkbox"/> Soybean Meal 48%	21	33	1	1.1	0	0.35	89	462.7	ton		
<input checked="" type="checkbox"/> Soybean Meal 44%	17.5	32.5	0.97	1.6	0	0.4	89	415.60	ton		
<input checked="" type="checkbox"/> Soybean Meal, expeller	30	16	1.09	8	0	0.36	92	439.15	ton		
<input checked="" type="checkbox"/> Soybeans, raw	12	28	1.25	19	0	0.32	87	450	ton		
<input checked="" type="checkbox"/> Soybeans, heated	22	21	1.24	19	0	0.26	92	700	ton		
<input checked="" type="checkbox"/> Good Quality Hay	6	14	0.6	2	35	1.3	87	260	ton		
<input checked="" type="checkbox"/> Poor Quality Hay	4.8	11.2	0.5	2	50	1	87	201	ton		
<input checked="" type="checkbox"/> Corn Silage	2.8	4.2	0.67	3.2	30	0.28	35	60	ton		
<input checked="" type="checkbox"/> Distillers Dried Grains	15	15	0.9	12	0	0.22	89	260	ton		
<input checked="" type="checkbox"/> High-Moisture Corn	3.6	5.4	0.95	4.2	0	0.03	70	200	ton		
<input checked="" type="checkbox"/> Tallow	0	0	2.06	100	0	0	99	25	cwt		
<input checked="" type="checkbox"/> Blood Meal	76	19	1.06	1.2	0	0.3	94	968	ton		
<input checked="" type="checkbox"/> Urea	0	287	0	0	0	0	99	500	ton		
<input checked="" type="checkbox"/> Straw	4	1	0.45	0.37	75	0.31	85	140	ton		
<input checked="" type="checkbox"/> Soy Hulls	6	8	0.67	2.7	0	0.63	89	225	ton		
<input checked="" type="checkbox"/> Corn Gluten Feed	7.5	16.5	0.79	3.5	0	0.7	89	242	ton		
<input checked="" type="checkbox"/> Canola Meal, expeller	17	21	0.8	5.4	0	0.75	89	325	ton		
<input checked="" type="checkbox"/> Canola Meal, solvent	13.5	24.5	0.74	1.5	0	0.75	89	400	ton		
<input checked="" type="checkbox"/> Cottonseed Meal	20	25	0.78	1.0	0	0.2	89	250	ton		

# FeedVal2012

4

Edit ingredients & their nutrient composition

Upload data as Excel file:  no file selected

Analyze  Disregard negative Nutrient Calculated Values

Select Number of Nutrients: 6

INPUTS - Nutrients for Ingredients							INPUTS - Price Inputs			OUTPUTS	
<input checked="" type="checkbox"/> Ingredient	Nutrient						As-Fed Basis			Calculated	
	RUP %	RDP %	NE13x M	Lipid %	peNDF	Ca %	DM %	Price \$/Unit	Unit	Predicted Value, \$/Unit	Actual Price as % of Predicted Value
Nutrient Calculated Value, \$/Unit DM											
Ingredients ↓											
<input checked="" type="checkbox"/> Shelled Corn	4.5	4.5	0.91	4.2	0	0.04	89	7.58	bu		
<input checked="" type="checkbox"/> Soybean Meal 48%	21	33	1	1.1	0	0.35	89	462.7	ton		
<input checked="" type="checkbox"/> Soybean Meal 44%	17.5	32.5	0.97	1.6	0	0.4	89	415.60	ton		
<input checked="" type="checkbox"/> Soybean Meal, expeller	30	16	1.09	8	0	0.36	92	439.15	ton		
<input checked="" type="checkbox"/> Soybeans, raw	12	28	1.25	19	0	0.32	87	458	ton		
<input checked="" type="checkbox"/> Soybeans, heated	22	21	1.24	19	0	0.26	92	700	ton		
<input checked="" type="checkbox"/> Good Quality Hay	6	14	0.6	2	35	1.3	87	260	ton		
<input checked="" type="checkbox"/> Poor Quality Hay	4.8	11.2	0.5	2	50	1	87	201	ton		
<input checked="" type="checkbox"/> Corn Silage	2.8	4.2	0.67	3.2	30	0.28	35	60	ton		
<input checked="" type="checkbox"/> Distillers Dried Grains	15	15	0.9	12	0	0.22	89	260	ton		
<input checked="" type="checkbox"/> High-Moisture Corn	3.6	5.4	0.95	4.2	0	0.03	70	200	ton		
<input checked="" type="checkbox"/> Tallow	0	0	2.06	100	0	0	99	25	cwt		
<input checked="" type="checkbox"/> Blood Meal	76	19	1.06	1.2	0	0.3	94	968	ton		
<input checked="" type="checkbox"/> Urea	0	287	0	0	0	0	99	500	ton		
<input checked="" type="checkbox"/> Straw	4	1	0.45	0.37	75	0.31	85	140	ton		
<input checked="" type="checkbox"/> Soy Hulls	6	8	0.67	2.7	0	0.63	89	225	ton		
<input checked="" type="checkbox"/> Corn Gluten Feed	7.5	16.5	0.79	3.5	0	0.7	89	242	ton		
<input checked="" type="checkbox"/> Canola Meal, expeller	17	21	0.8	5.4	0	0.75	89	325	ton		
<input checked="" type="checkbox"/> Canola Meal, solvent	13.5	24.5	0.74	1.5	0	0.75	89	400	ton		



# FeedVal2012

5

Edit ingredients units, DM & prices

Upload data as Excel file:  no file selected

Analyze  Disregard negative Nutrient Calculated Values

Select Number of Nutrients: 6

INPUTS - Nutrients for Ingredients							INPUTS - Price Inputs			OUTPUTS	
<input checked="" type="checkbox"/> Ingredient	Nutrient						As-Fed Basis			Calculated	
	RUP %	RDP %	NE13x M	Lipid %	peNDF	Ca %	DM %	Price \$/Unit	Unit	Predicted Value, \$/Unit	Actual Price as % of Predicted Value
Nutrient Calculated Value, \$/Unit DM											
Ingredients ↓											
<input checked="" type="checkbox"/> Shelled Corn	4.5	4.5	0.91	4.2	0	0.04	89	7.58	bu		
<input checked="" type="checkbox"/> Soybean Meal 48%	21	33	1	1.1	0	0.35	89	462.7	ton		
<input checked="" type="checkbox"/> Soybean Meal 44%	17.5	32.5	0.97	1.6	0	0.4	89	415.60	ton		
<input checked="" type="checkbox"/> Soybean Meal, expeller	30	16	1.09	8	0	0.36	92	439.15	ton		
<input checked="" type="checkbox"/> Soybeans, raw	12	28	1.25	19	0	0.32	87	450	ton		
<input checked="" type="checkbox"/> Soybeans, heated	22	21	1.24	19	0	0.26	92	700	ton		
<input checked="" type="checkbox"/> Good Quality Hay	6	14	0.6	2	35	1.3	87	260	ton		
<input checked="" type="checkbox"/> Poor Quality Hay	4.8	11.2	0.5	2	50	1	87	201	ton		
<input checked="" type="checkbox"/> Corn Silage	2.8	4.2	0.67	3.2	30	0.28	35	60	ton		
<input checked="" type="checkbox"/> Distillers Dried Grains	15	15	0.9	12	0	0.22	89	260	ton		
<input checked="" type="checkbox"/> High-Moisture Corn	3.6	5.4	0.95	4.2	0	0.03	70	200	ton		
<input checked="" type="checkbox"/> Tallow	0	0	2.06	100	0	0	99	25	cwt		
<input checked="" type="checkbox"/> Blood Meal	76	19	1.06	1.2	0	0.3	94	968	ton		
<input checked="" type="checkbox"/> Urea	0	287	0	0	0	0	99	500	ton		
<input checked="" type="checkbox"/> Straw	4	1	0.45	0.37	75	0.31	85	140	ton		
<input checked="" type="checkbox"/> Soy Hulls	6	8	0.67	2.7	0	0.63	89	225	ton		
<input checked="" type="checkbox"/> Corn Gluten Feed	7.5	16.5	0.79	3.5	0	0.7	89	242	ton		
<input checked="" type="checkbox"/> Canola Meal, expeller	17	21	0.8	5.4	0	0.75	89	325	ton		
<input checked="" type="checkbox"/> Canola Meal, solvent	13.5	24.5	0.74	1.5	0	0.75	89	400	ton		
<input checked="" type="checkbox"/> Cottonseed Meal	20	25	0.78	1.0	0	0.2	89	250	ton		



# FeedVal2012

6

Perform a calculation!

Upload data as Excel file:  no file selected

Disregard negative Nutrient Calculated Values

Select Number of Nutrients:

INPUTS - Nutrients for Ingredients							INPUTS - Price Inputs			OUTPUTS	
Ingredient	Nutrient						As-Fed Basis			Calculated	
	RUP %	RDP %	NE13x M	Lipid %	peNDF	Ca %	DM %	Price \$/Unit	Unit	Predicted Value, \$/Unit	Actual Price as % of Predicted Value
Shelled Corn	4.5	4.5	0.91	4.2	0	0.04	89	7.58	bu	7.175 /bu	106
Soybean Meal 48%	21	33	1	1.1	0	0.35	89	462.7	ton	457.830 /ton	101
Soybean Meal 44%	17.5	32.5	0.97	1.6	0	0.4	89	415.60	ton	421.416 /ton	99
Soybean Meal, expeller	30	16	1.09	8	0	0.36	92	439.15	ton	540.529 /ton	81
Soybeans, raw	12	28	1.25	19	0	0.32	87	450	ton	419.164 /ton	107
Soybeans, heated	22	21	1.24	19	0	0.26	92	700	ton	513.416 /ton	136
Good Quality Hay	6	14	0.6	2	35	1.3	87	260	ton	208.104 /ton	125
Poor Quality Hay	4.8	11.2	0.5	2	50	1	87	201	ton	170.824 /ton	118
Corn Silage	2.8	4.2	0.67	3.2	30	0.28	35	60	ton	73.193 /ton	82
Distillers Dried Grains	15	15	0.9	12	0	0.22	89	260	ton	352.972 /ton	74
High-Moisture Corn	3.6	5.4	0.95	4.2	0	0.03	70	200	ton	204.297 /ton	98
Tallow	0	0	2.06	100	0	0	99	25	cwt	24.841 /cwt	101
Blood Meal	76	19	1.06	1.2	0	0.3	94	968	ton	947.340 /ton	102
Urea	0	287	0	0	0	0	99	500	ton	500.270 /ton	100
Straw	4	1	0.45	0.37	75	0.31	85	140	ton	133.790 /ton	105
Soy Hulls	6	8	0.67	2.7	0	0.63	89	225	ton	218.846 /ton	103
Corn Gluten Feed	7.5	16.5	0.79	3.5	0	0.7	89	242	ton	272.393 /ton	89
Canola Meal, expeller	17	21	0.8	5.4	0	0.75	89	325	ton	358.360 /ton	91
Canola Meal, solvent	13.5	24.5	0.74	1.5	0	0.75	89	400	ton	322.765 /ton	124
Cottonseed Meal	20	25	0.78	1.0	0	0.2	89	250	ton	284.871 /ton	91

# FeedVal2012

7

Analyze results

Upload data as Excel file:  no file selected

Disregard negative Nutrient Calculated Values

Select Number of Nutrients:

INPUTS - Nutrients for Ingredients

Ingredient	Nutrient					
	RUP %	RDP %	NE13x M	Lipid %	peNDF	Ca %
Nutrient Calculated Value, \$/Unit DM						
Ingredients ↓						
Shelled Corn	4.5	4.5	0.91	4.2	0	0.04
Soybean Meal 48%	21	33	1	1.1	0	0.35
Soybean Meal 44%	17.5	32.5	0.97	1.6	0	0.4
Soybean Meal, expeller	30	16	1.09	8	0	0.36
Soybeans, raw	12	28	1.25	19	0	0.32
Soybeans, heated	22	21	1.24	19	0	0.26
Good Quality Hay	6	14	0.6	2	35	1.3
Poor Quality Hay	4.8	11.2	0.5	2	50	1
Corn Silage	2.8	4.2	0.67	3.2	30	0.28
Distillers Dried Grains	15	15	0.9	12	0	0.22
High-Moisture Corn	3.6	5.4	0.95	4.2	0	0.03
Tallow	0	0	2.06	100	0	0
Blood Meal	76	19	1.06	1.2	0	0.3
Urea	0	287	0	0	0	0
Straw	4	1	0.45	0.37	75	0.31
Soy Hulls	6	8	0.67	2.7	0	0.63
Corn Gluten Feed	7.5	16.5	0.79	3.5	0	0.7
Canola Meal, expeller	17	21	0.8	5.4	0	0.75
Canola Meal, solvent	13.5	24.5	0.74	1.5	0	0.75
Cottonseed Meal	20	25	0.78	1.9	0	0.2

INPUTS - Price Inputs

As-Fed Basis		
2012 November		
DM %	Price \$/Unit	Unit
89	7.58	bu
89	462.7	ton
89	415.60	ton
92	439.15	ton
87	450	ton
87	260	ton
87	201	ton
35	60	ton
70	200	ton
99	25	cwt
94	968	ton
99	500	ton
85	140	ton
89	225	ton
89	242	ton
89	325	ton
89	400	ton
89	250	ton

OUTPUTS

Calculated	
Predicted Value, \$/Unit	Actual Price as % of Predicted Value
7.175 /bu	106
457.830 /ton	101
421.416 /ton	99
540.529 /ton	81
419.164 /ton	107
513.416 /ton	136
208.104 /ton	125
170.824 /ton	118
73.193 /ton	82
352.972 /ton	74
204.297 /ton	98
24.841 /cwt	101
947.340 /ton	102
500.270 /ton	100
133.790 /ton	105
218.846 /ton	103
272.393 /ton	89
358.360 /ton	91
322.765 /ton	124
284.871 /ton	91

Overpriced

Bargain!

Annotations on the OUTPUTS table:

- Row 6: 513.416 /ton, 136 (Circled, with arrow from "Overpriced")
- Row 10: 352.972 /ton, 74 (Circled, with arrow from "Bargain!")

# FeedVal applications

## Monthly market watch

Best feed ingredient prices  
ranked

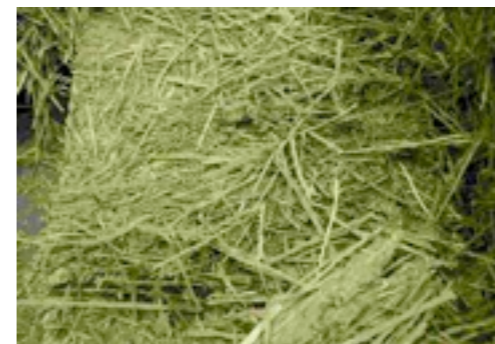


## Pricing drought stressed corn silage

Assessment according to  
nutrient content

## Pricing treated alfalfa hay

Fair price  
Justify treating?



# June 2013 market watch

FeedVal 2012 predicted dairy feed prices and rankings for June 2013 <sup>1</sup>						
V.E. Cabrera, P. Hoffman, and R. Shaver						
Ingredient	DM %	Unit	Feed Prices (\$/Unit)		Actual Price as % of Predicted Value	Best-buy Ranking
			Market	Predicted		
Wet Distillers	45	ton	76.0	183.7	41	1
Distillers Dried Grains	89	ton	225.0	373.7	60	2
Corn Gluten Feed	89	ton	163.0	270.5	60	3
Wheat Middlings	89	ton	190.0	236.0	81	4
Corn Gluten Meal	89	ton	570.0	637.3	89	5
Soy Hulls	89	ton	195.0	216.3	90	6
Hominy	89	ton	225.0	243.9	92	7
Corn Silage	35	ton	66.9	72.4	92	8
Wheat	89	bu	6.6	7.2	93	9
Shelled Corn	89	bu	6.7	7.1	94	10
Cottonseed Meal	89	ton	370.0	385.3	96	11
Urea	99	ton	505.0	503.8	100	12
Canola Meal, expeller	89	ton	365.0	364.9	100	13
Sunflower Meal	89	ton	245.0	242.5	101	14
Barley	89	cwt	11.9	11.7	102	15
Tallow	99	cwt	37.5	36.4	103	16
Soybean Meal 48%	89	ton	472.0	453.1	104	17
Blood Meal	94	ton	1025.0	966.0	106	18
Poor Quality Hay	87	ton	184.5	168.5	109	19
Molasses	89	ton	220.0	199.2	110	20
Linseed Meal	89	ton	365.0	323.4	113	21
Soybean Meal 44%	89	ton	475.0	416.8	114	22
Whole Cottonseed	89	ton	358.0	311.9	115	23
Soybeans, raw	87	bu	15.4	12.6	123	24
Good Quality Hay	87	ton	263.6	204.3	129	25
Beet Pulp	89	ton	270.0	199.8	135	26
Oats	89	ton	383.0	239.9	160	27
Soybean Meal, expeller	92	ton		555.1		
Soybeans, heated	92	ton		549.7		
Earlage/Snaplage	60	ton		153.5		
High-Moisture Corn	70	ton		201.5		
Straw	85	ton		129.1		
Canola Meal, solvent	89	ton		319.4		
Hi-Pro Distillers	89	ton		428.3		
Brewers Dried Grains	89	ton		333.5		
Wet Brewers	25	ton		87.8		
Malt Sprouts	89	ton		263.9		
Wheat Bran	89	ton		220.8		
Corn Stover	80	ton		106.4		
Whey	20	ton		47.3		

Bargain

Overpriced

Best

OK

Worst

Predicted Prices

<sup>1</sup>Analysis performed using UW-Madison FeedVal 2012: [http://dairymgt.info/tools/feedval\\_12/index.php](http://dairymgt.info/tools/feedval_12/index.php) including 27 feed ingredients displayed in top part of the table, 4 nutrients: RUP, RDP, NEL, and peNDF; and using general wholesale FOB Midwest input prices. These results might change substantially depending on: local input prices, nutrients, and feed ingredients used for price formation. For more in-depth analyses please use the FeedVal 2012 decision support tool and local input prices.



# Nutritional Grouping Strategies

# Feeding lactating cows differently

Some cows might be overfed

## Same ration to all cows

All lactating cows receive same density diet



## Preferred “high” rations

Low producing animals receive more nutrients than required



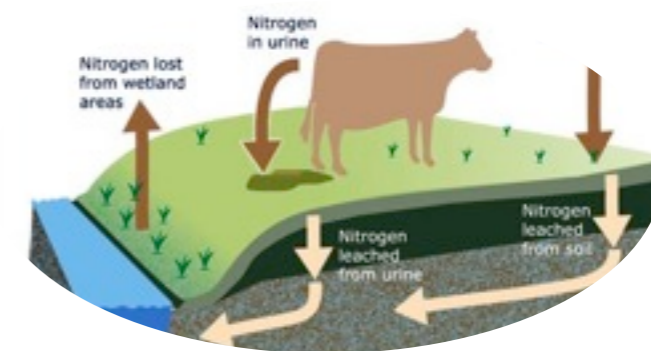
# Possible solution

Consider additional feeding groups



**Less nutrient excretion**

Decreased environmental concerns



**Improved nutrient use efficiency**

Diet closer to cow requirements

**Less overfed animals**

Decreased overweighted COWS

**Lower feeding costs**

Higher milk income over feed cost



# Why do not group more?

Probably many reasons

**Farm facilities or equipment limitations**

Physical constraints

**Not enough labor or personnel**

Labor constraints

**Not enough expertise or knowledge available**

Management constraints

**Other reasons**

Trying to find them

The image shows two pages of a survey form titled "B. BREEDING & MATING FOR LACTATING COWS". The form is divided into two main sections: "A. BASIC FARM INFORMATION" and "B. BREEDING & MATING FOR LACTATING COWS".

**Section A: BASIC FARM INFORMATION**

- A.1. Number of dairy cattle and equines owned (by sex and age).
- A.2. Milk production on your farm.
- A.3. Describe the milking system of the dairy operation.
- A.4. What practices do you use to optimize the herd genetics (check all that apply)?
- A.5. Do you consider your herd to be managed professionally or pasture-based, outside the farm?
- A.6. Do you have pasture access for the lactating cows?
- A.7. Describe your genetic breeding goals for the lactating herd.
- A.8. Physical structure of Lactating Cows, before and after of agreement with the following categories.

**Section B: BREEDING & MATING FOR LACTATING COWS**

- B.1. Describe your breeding system for lactating cows (check all that apply).
- B.2. Do you have different systems (check all that apply)?
- B.3. Describe the Lactating Cows, before and after of agreement with the following categories.
- B.4. Describe the Lactating Cows, before and after of agreement with the following categories.
- B.5. Would you consider breeding a Lactating Cow for reproduction of other? (Yes/No)

The form includes several tables for data collection, such as "Lactating Cows by Breed" and "Lactating Cows by Age Group".

# Strategies for grouping cows

Depend on farm and herd characteristics

## Individual cow nutrient requirements

- Energy
- Protein

## Number of lactating cows on the herd

## Farm characteristics

Capacity to handle lactating feeding groups



Adapted from McGilliard et al., 1983;  
St-Pierre and Thraen, 1999

# Cow nutrient requirement

## Energy

### Total net energy ( $NE_{total}$ )

Energy required for  
maintenance + energy  
required for milk  
production

$$NE_{total} (Mcal) = NE_{maintenance} + NE_{milk}$$

### $NE_{maintenance}$

Function of animal  
body weight

$$NE_{maintenance} = 0.079 \times BW^{0.75}$$



### $NE_{milk}$

Function of milk and  
fat production

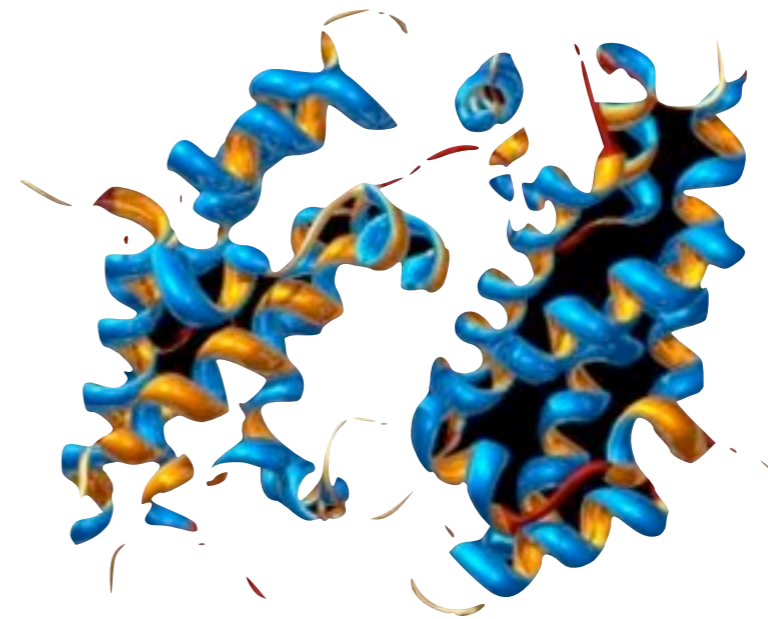
$$NE_{milk} = Milk \times (0.36 + 0.0969 \times Fat\%)$$

# Cow nutrient requirement

## Protein

### Total crude protein ( $CP_{total}$ )

Protein required for  
maintenance + protein  
required for milk  
production



$$CP_{total} (g) = CP_{maintenance} + CP_{milk}$$

### $CP_{maintenance}$

Function of animal body  
weight

$$CP_{maintenance} = 104.78 + 0.73 \times BW - 0.00015432 \times BW^2$$

### $CP_{milk}$

Function of milk and fat  
production

$$CP_{milk} = Milk \times (4586 + 1036 \times Fat\%)$$

# Cow feed requirement

## Dry matter intake

### Total dry matter intake (DMI)

Function of DIM, BW, and 4% fat corrected milk (4% FCM)



$$DMI (kg) = (0.372 \times 4\% FCM + 0.0968 \times BW^{0.75}) \times (1 - e^{(-0.192 \times ((DIM/7) + 3.67)})}$$

$$4\% FCM = 0.4 \times Milk + 15 \times (Fat\%/100) \times Milk$$

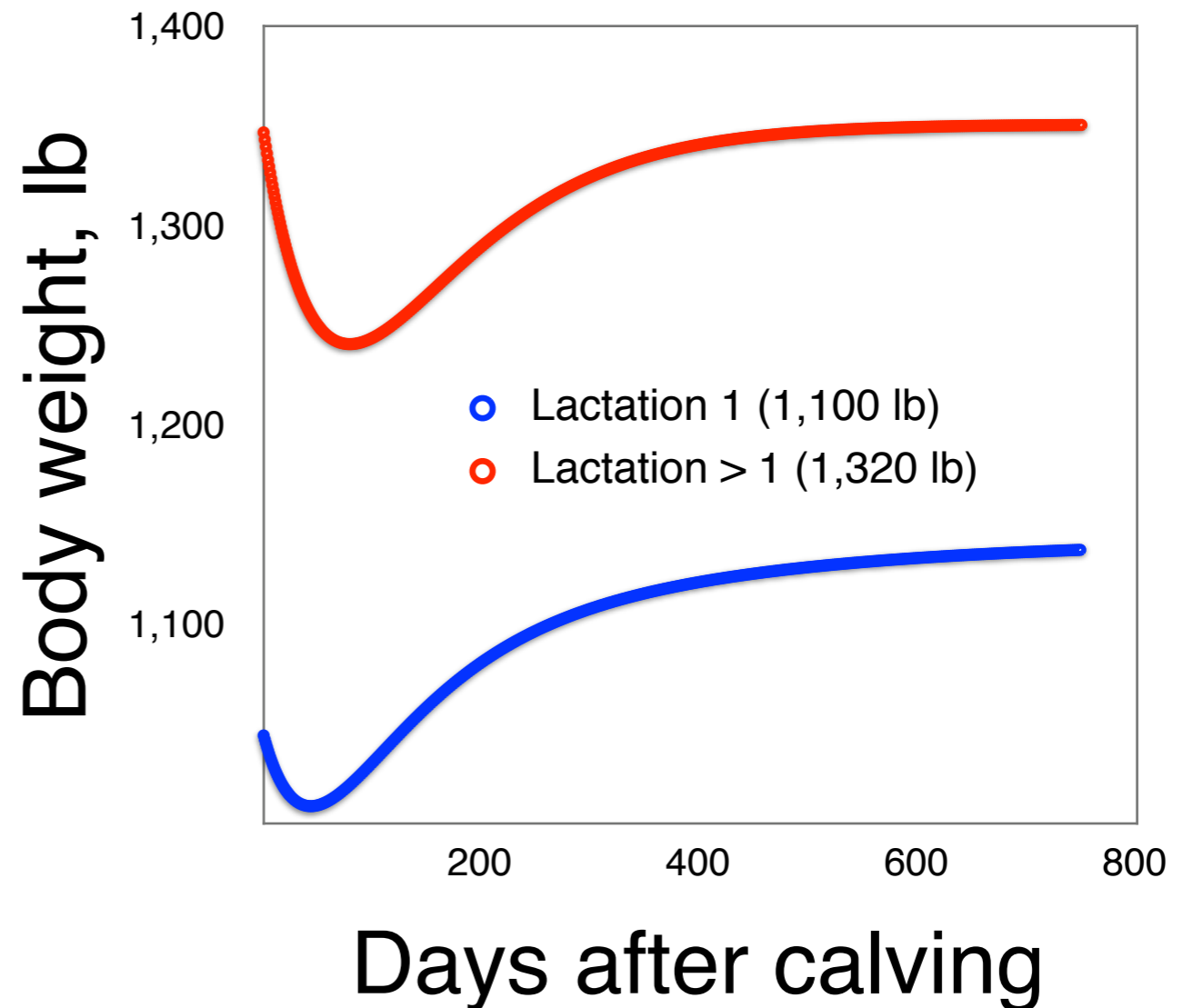
# Cow body weight

Measurements are not always available



## Estimation based on

- Lactation
- DIM
- Cohorts' average BW



Korver et al., 1985 function  
fitted to NRC, 2001

# Nutrient requirement for a group

Energy and protein

## Lead factor

Multiplicative factor to adjust nutrient requirements of a group

$$NE_{group} (Mcal) = 83^{rd} \text{ Percentile}$$

$$CP_{group} (\%) = 83^{rd} \text{ Percentile}$$





# Criteria for grouping

Several criteria exist

## Days after calving (DIM)

Based on stage of lactation

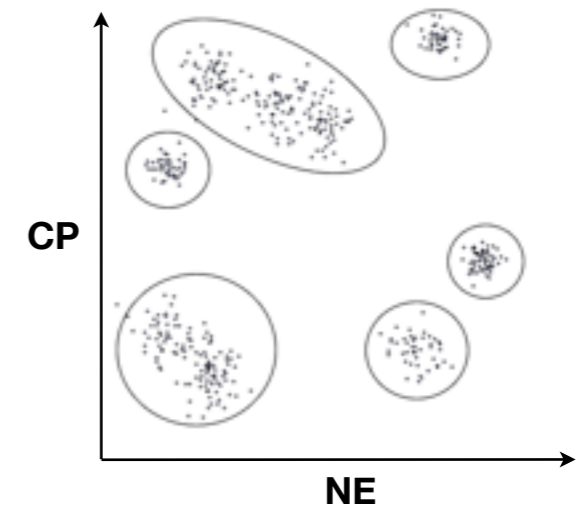


## Fat corrected milk

Based on level of production measured as FCM

## Dairy merit

Function of both FCM and BW



## Cluster

Function of NE and CP.  
Seems to be most efficient criterion.

McGilliard et al., 1983; St-Pierre and Thraen, 1999

# Calculate the value of NE and CP

Determine diets' cost

**Value of NE and CP  
could be deducted**

Using referee feeds

**Price NE and CP**

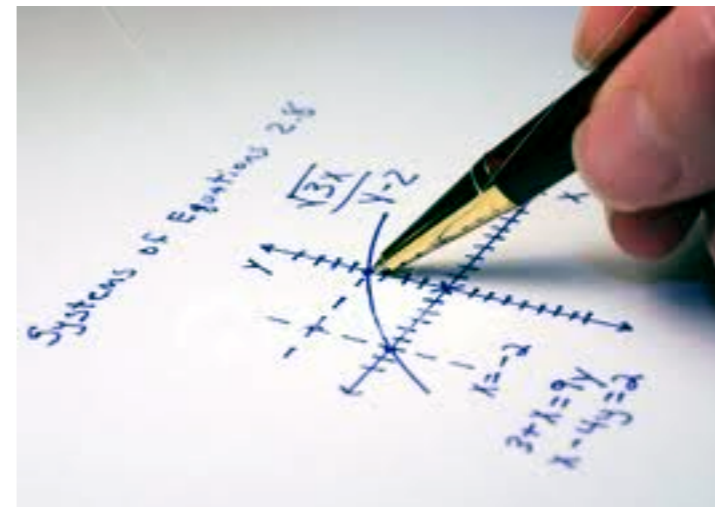
Nutrient values NE (\$/  
Mcal) and CP (\$/kg)

***Corn %CP + Corn Mcal NE = \$/kg Corn Price***

***SBM %CP + SBM Mcal NE = \$/kg SBM Price***

**Value of NE and CP  
could be available on a  
farm**

Based on farm  
experience

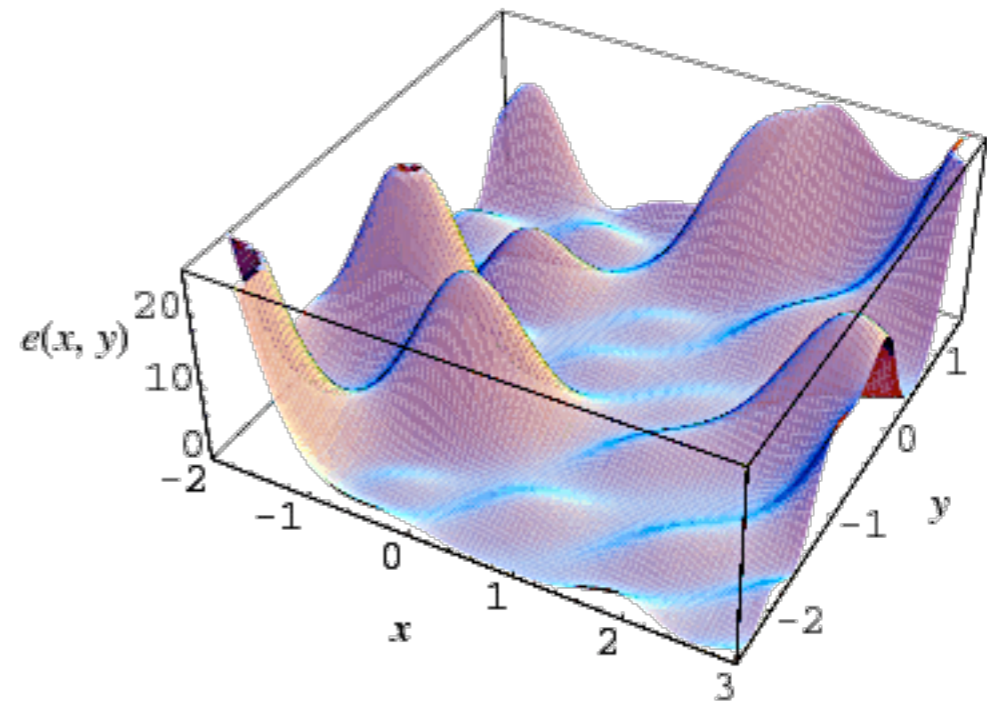


# Optimize cows to a feeding group

Maximize the income over feed cost

## Non-linear optimization

- Iterative process
- Search for global maxima IOFC



$$\mathbf{Max}(IOFC) = \mathbf{SUM}(IOFC_{group})$$

$$\mathbf{IOFC}_{group} = \mathbf{Milk\ Value} - \mathbf{Feed\ Cost}$$

# Additional costs and benefits

Impacts grouping feeding strategies

## Management cost

- Additional labor
- Extra management

## Avoid costs

- Additives savings

## Milk depression

- Cow social interactions
- Diet changes

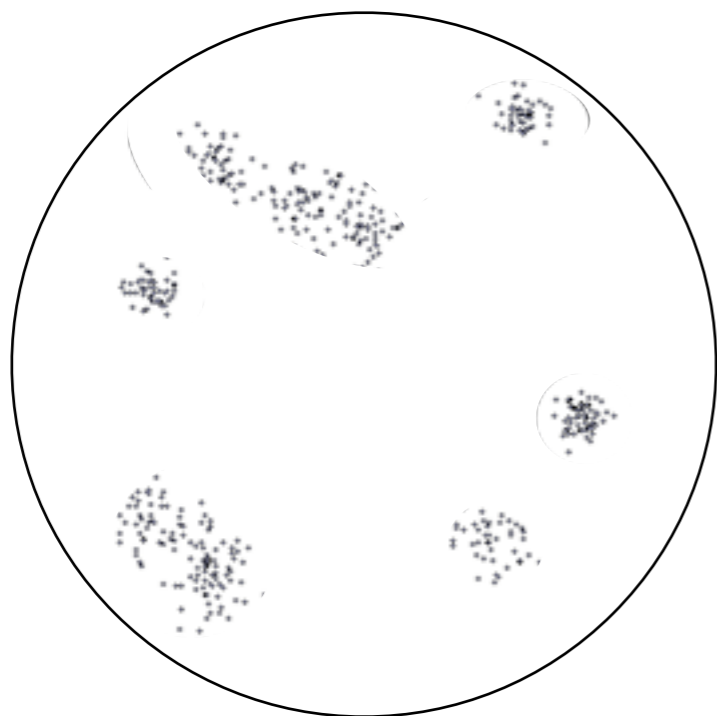


# Overall net return

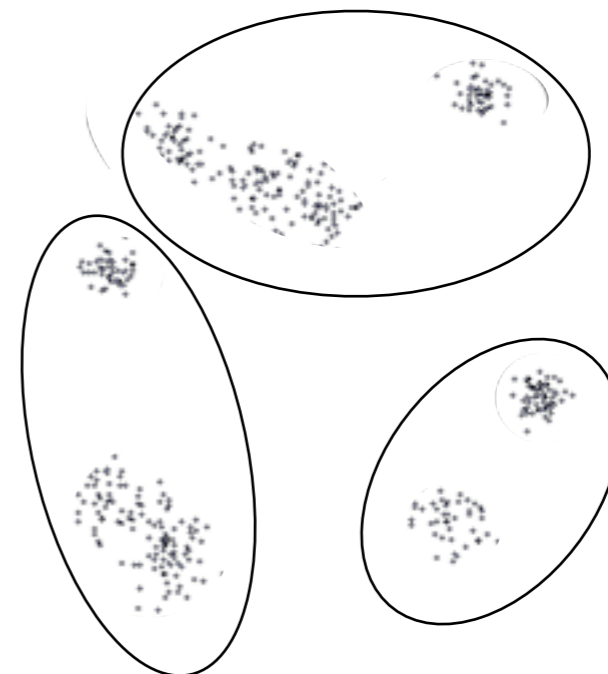
## Bottom line grouping strategies

### Net return

- + Max (IOFC)
- Extra management
- Milk depression
- + Savings

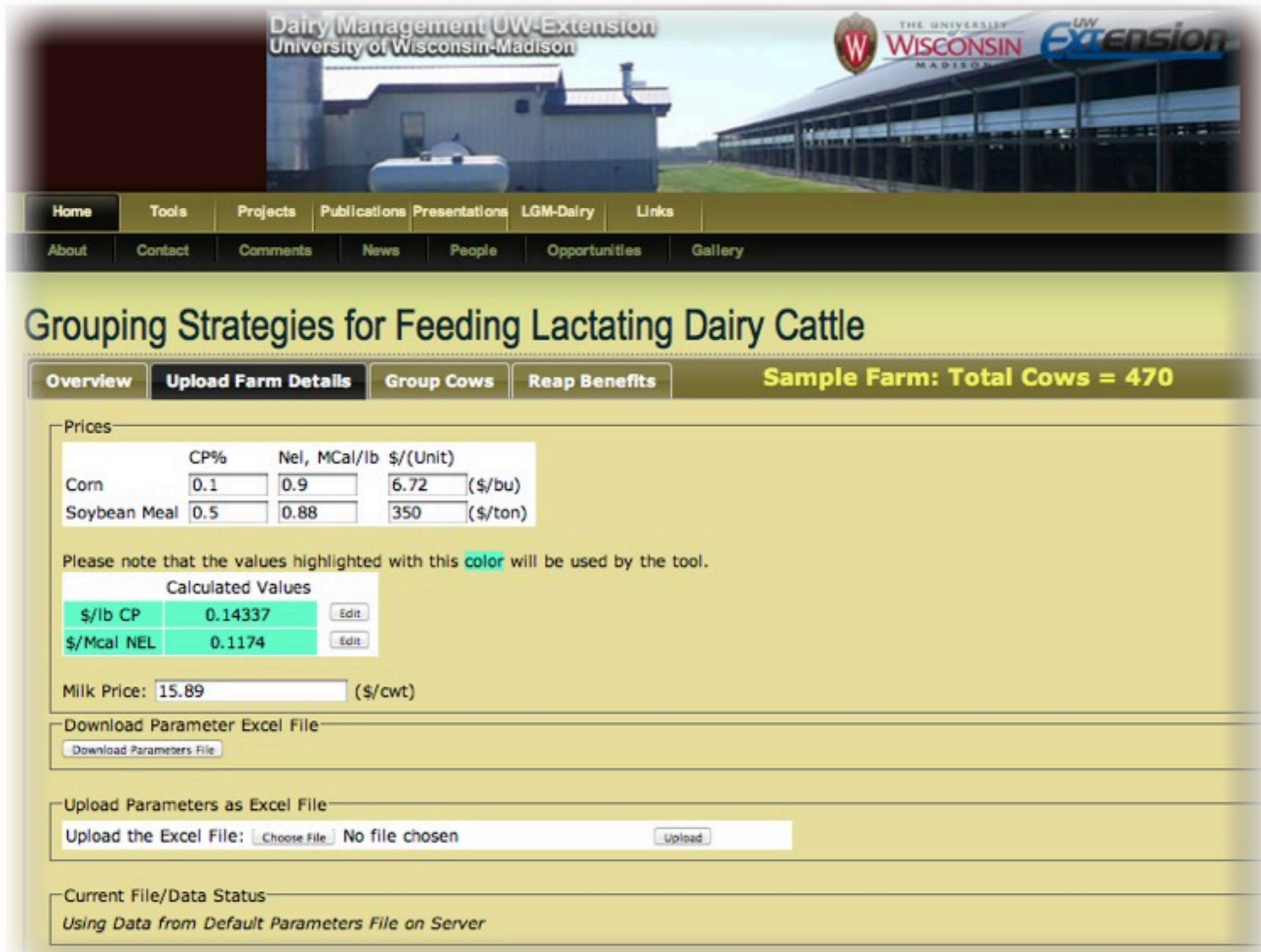


vs.



# Grouping strategies

## For feeding lactating dairy cattle



Dairy Management UW-Extension  
University of Wisconsin-Madison

THE UNIVERSITY OF WISCONSIN MADISON UW Extension

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### Grouping Strategies for Feeding Lactating Dairy Cattle

Overview **Upload Farm Details** Group Cows Reap Benefits **Sample Farm: Total Cows = 470**

Prices

	CP%	Nel, MCal/lb	\$(Unit)
Corn	0.1	0.9	6.72 (\$/bu)
Soybean Meal	0.5	0.88	350 (\$/ton)

Please note that the values highlighted with this color will be used by the tool.

Calculated Values

\$/lb CP	0.14337	Edit
\$/Mcal NEL	0.1174	Edit

Milk Price: 15.89 (\$/cwt)

Download Parameter Excel File  
Download Parameters File

Upload Parameters as Excel File  
Upload the Excel File: Choose File No file chosen Upload

Current File/Data Status  
Using Data from Default Parameters File on Server

# Get the farm data

Farm time specific dataset

## NE and CP value

- Farm known value
- Calculated from corn and soybean meal

## Milk price

- Farm known value

## Grouping strategies

- Farm current situation
- Possible situations

## Cow information

Table of specific data

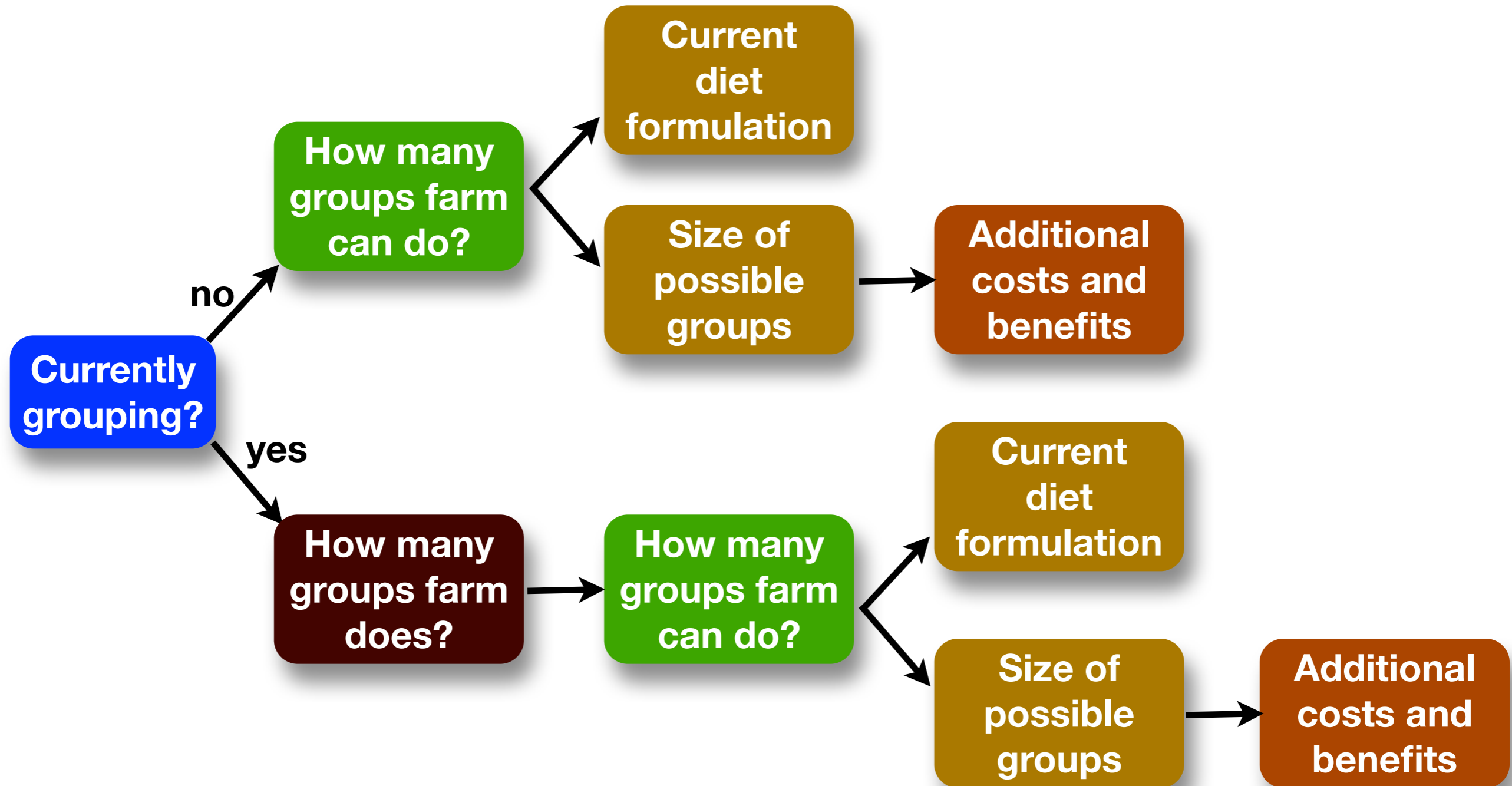
Cow ID	Parity	DIM	Milk, lb/d	Milk fat, %
6234	1	84	62	4.1
132	7	118	73	3.8
6196	1	198	85	3.4
6149	4	199	114	3.6
5045	2	280	81	4.3

## Additional information

- Cow's BW, or
- Parity's average BW

# Grouping strategies

## Farm possibilities

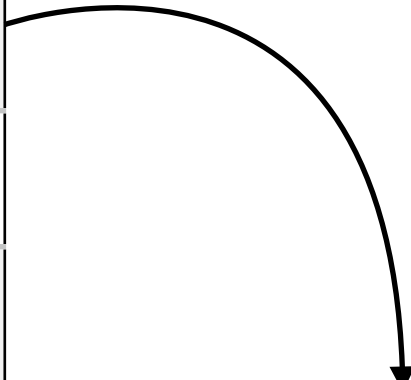




# Tool illustration

## Economic impact of grouping

Current situation	
Lactating cows	470
Number groups	None
NE, Mcal/lb	0.80
CP, %	17%

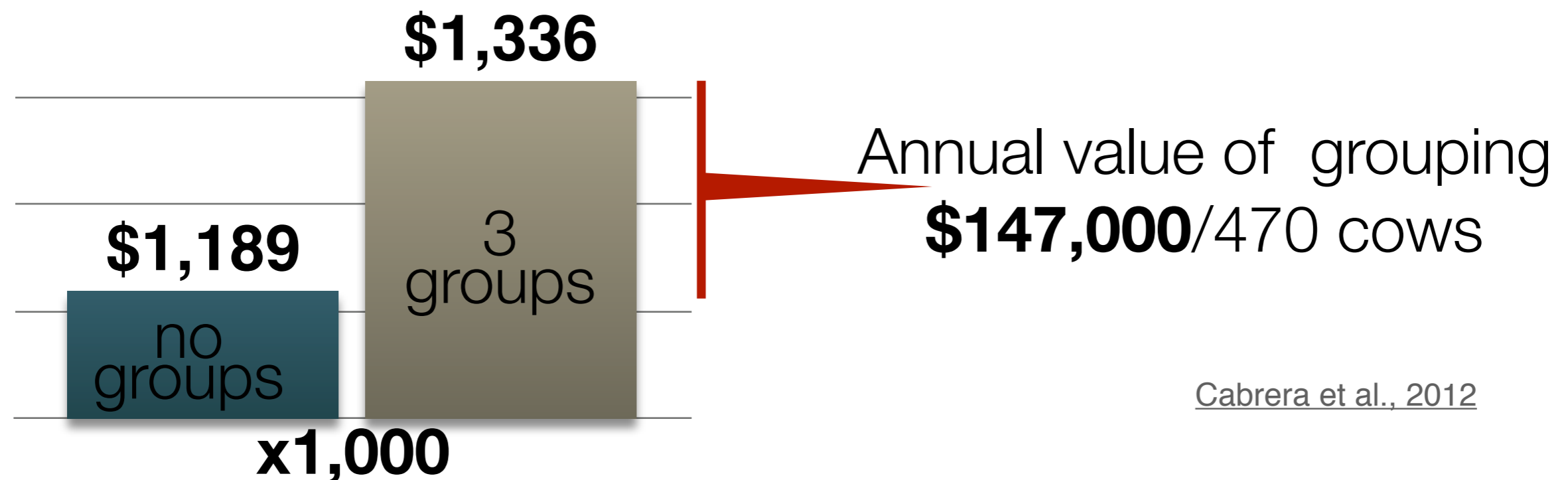


Possible situation	
Number groups	3
Group sizes	100, 100, 270
Added cost, \$	\$1,000/month
Milk loss	5 lb/cow
Milk loss time	4 days
Saved cost, \$	\$0

# Decision support system illustration

## Cluster grouping criteria

	Possible situation			
	Cow numbers	NE, Mcal/lb	CP, %	IOFC, \$/cow/day
Group 1	270	0.71	16.05	9.3
Group 2	100	0.65	14.18	7.2
Group 3	100	0.62	13.07	4.7



# Analysis from dairy farm records

30 Wisconsin dairy farms

## No grouping vs. 3 groups

- Same size groups

## Same prices for all

- \$15.89/cwt milk
- \$0.14337/lb CP
- \$0.1174/Mcal NEI

## Cluster grouping

- 83<sup>rd</sup> percentile CP and NEI



## Projected body weight

- 1,100 lb primiparous
- 1,300 lb multiparous

# Analysis from dairy farm records

30 Wisconsin dairy farms

	Number of lactating cows (n=30)	Income over Feed Cost (no grouping)	Income over Feed Cost (3 groups)
		\$/cow per year	
Mean	788	\$2,311	<b>\$2,707</b>
Minimum	< 200	\$697	<b>\$1,059</b>
Maximum	> 1,000	\$2,967	<b>\$3,285</b>

## Increase of IOFC (\$/cow per year)

- Between 7 and 52%
- Mean = \$396
- Range = \$161 to \$580

## After reasonable extra costs

- Still increased net margin of between 5 and 47%



**Thanks**