



# INCOME OVER FEED COST FOR WISCONSIN DAIRY FARMS



1 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009



17:56



# TODAY TALK



2 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

- **Maximization of Income Over Feed Cost**
  - Max IOFC
- **Wisconsin Dairy Feed Cost Evaluator**
  - IOFC Database
- **Summary of Wisconsin Income Over Feed Cost**
  - IOFC for Jul-Sep Wisconsin selected farms

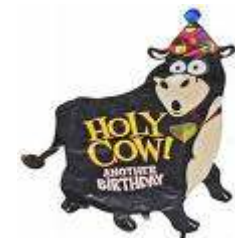




# INTRODUCTION



- Profit margin may shrink rapidly when milk prices go down and feed prices go up
- Milk and feed prices are more volatile than ever
- More than 90% of dairy farm revenue may come from the milk check
- More than 50% of dairy farm expenses may be feed related expenses
- At a determined feed efficiency level, IOFC depends solely on milk and feed prices





# INTRODUCTION



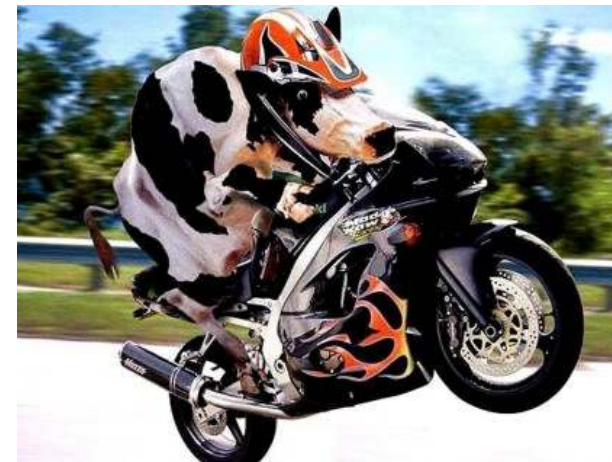
4 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

## IOFC (\$/cow/day), 75 lb/cow/day, 1.5 FE

	Milk Price (\$/cwt)							
	10	12	14	16	18	20	22	24
0.08	3.50	5.00	6.50	8.00	9.50	11.00	12.50	14.00
0.1	2.50	4.00	5.50	7.00	8.50	10.00	11.50	13.00
0.12	1.50	3.00	4.50	6.00	7.50	9.00	10.50	12.00
0.14	0.50	2.00	3.50	5.00	6.50	8.00	9.50	11.00
0.16	-0.50	1.00	2.50	4.00	5.50	7.00	8.50	10.00
0.18	-1.50	0.00	1.50	3.00	4.50	6.00	7.50	9.00
0.2	-2.50	-1.00	0.50	2.00	3.50	5.00	6.50	8.00
0.22	-3.50	-2.00	-0.50	1.00	2.50	4.00	5.50	7.00
0.24	-4.50	-3.00	-1.50	0.00	1.50	3.00	4.50	6.00
0.26	-5.50	-4.00	-2.50	-1.00	0.50	2.00	3.50	5.00

# INTRODUCTION

- It is important that correct decisions are made to maximize milk revenue on feed expenses at a given feed efficiency level





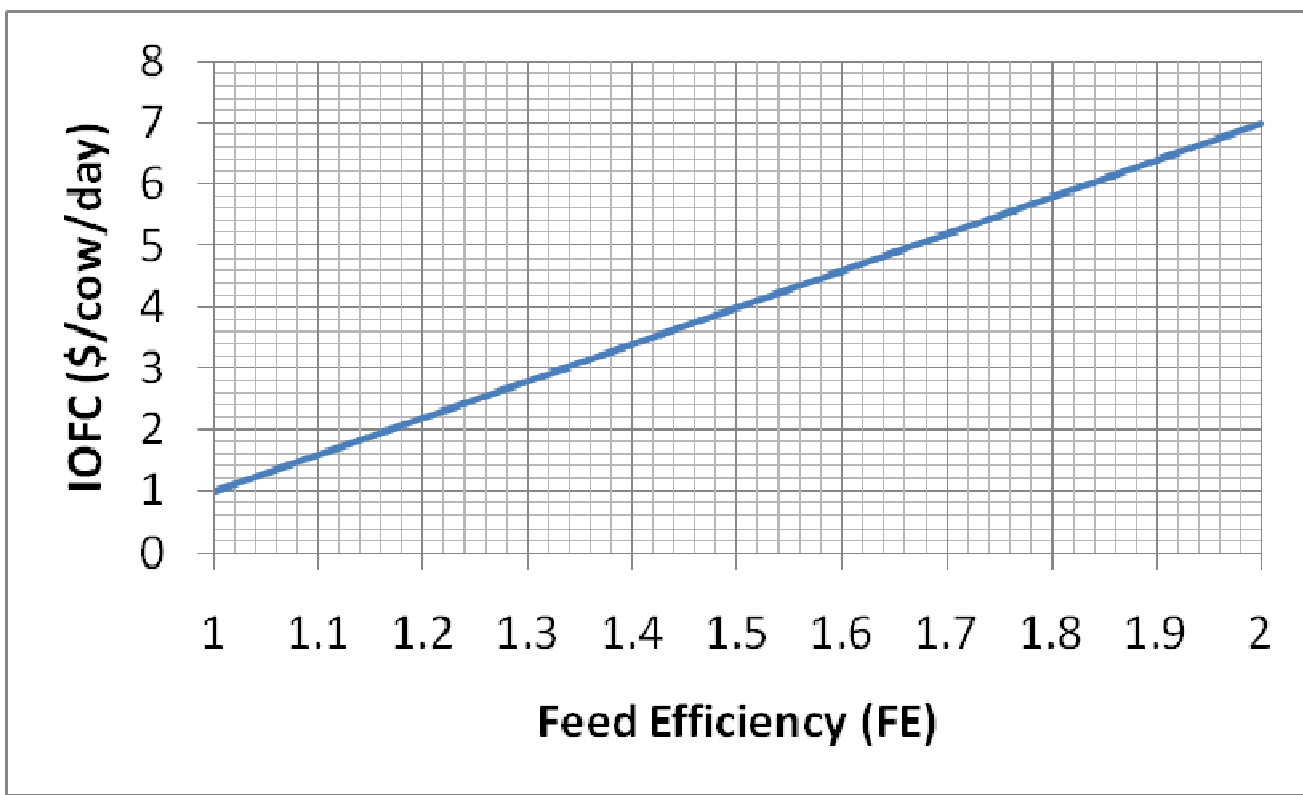
# INTRODUCTION



6 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

## IOFC (\$/cow/day)

Milk=\$12/cwt, Feed Cost= \$0.1/lb DM



# INTRODUCTION

- It is important that correct decisions are made to maximize feed efficiency level and return on feed expenses





# FRAMEWORK



- Traditional diet formulations are based on finding the least cost ration that provides the minimum level of required level nutrients for a desired level of production:
  - 1) Target production (e.g., Milk = 75 lb)
  - 2) Nutrient requirements (e.g., CP = 17%)
  - 3) Available feed ingredients (e.g., SBM)
  - 4) Feed costs (e.g., SBM = \$350/ton)





# FRAMEWORK



- Traditional diet formulations do not maximize IOFC
- Milk production (milk/cow/day) would change according to changes in CP, RUP, RDP. Maybe:
  - 16.5% CP would achieve 75 lb milk/cow/day, or
  - 17% CP would achieve 80 lb milk/cow/day, or
  - Would be better to produce only 70 lb milk/cow/day depending on milk price and feed ingredient prices
- Same concept could be applied to other diet nutrients (e.g., amino acids)



# FRAMEWORK



- Evidence indicates that IOFC can be maximized by fine-tuning CP and adjusting the levels of RUP and RDP
- Selection of ingredients would vary according to milk price and feed ingredients
- A maximum IOFC is found when the optimal level of CP that also implies less amount of N excreted
- There are some application that calculate IOFC for defined diets (e.g., IFSM), but: 1) do not perform optimization and 2) serve mostly the scientific community



# The IOFSC Application



- **User-friendly spreadsheet or Web-based system that maximizes IOFC to defined:**
  - **Feed ingredients and prices**
  - **Maximum RUP and RDP levels**
  - **Expected milk production and milk price**



# The IOFSC Application



12 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

Beta test: <http://dairymgt.info/web/>

The screenshot shows the IOFSC application interface. At the top, there are logos for UW Extension, The University of Wisconsin-Madison, and the Dairy team. Below the logos is a navigation bar with tabs for English, Metric, Documentation, and Instructions. A large image of a dairy farm is displayed. The main content area is divided into three sections:

**I Calculate Dry Matter Intake**

1. Milk Production	110	lb/cow/day
2. Body Weight	1380	lb/cow
3. Days in Milk	180	day
4. Dry Matter Intake	67.53	lb/cow/day

**II Set the Sources and Proportion of Forage in the Diet**

Proportion of Forage in diet: 50 %

35-Corn Silage-CuSi	100	% of Forage	Edit Row
---------------------	-----	-------------	----------

Crude Protein in Diet Provided by Forage: 297 lb/cow/day

Add Row

**III Set Source of Energy Supplements and Prices**

Source	Price (\$/bu)	Upper Limit (lb)	Edit Row
35-Corn Silage-CuSi	4	15	Edit Row

17:56





# The IOFSC Application



I

## Calculate Dry Matter Intake

1. Milk Production	75	lb/cow/day
2. Body Weight	1400	lb/cow
3. Days in Milk	150	day
4. Dry Matter Intake	54.67	lb/cow/day  

- **A cow (or cow group) in mid lactation (150 DIM):**
  - Is expected to produce around 75 lb/day
  - Weight around 1400 lb
  - Requires around 55 lb of DMI
- **However, the nutritionist thinks that the DMI for that cow (or cow group) should be around 50 lb/day**



# The IOFSC Application



II

## Set the Sources and Proportion of Forage in the Diet

Proportion of Forage in diet **50** %

35-Corn Silage-CoSi	50	% of Forage	Edit Row
83-Alf Silage -Alsi	50	% of Forage	Edit Row
74-Mx. Silage-MxSi	0	% of Forage	Edit Row

Crude Protien in Diet Provided by Forage **3.86** lb/cow/day

Add Row

- The cow (or cow group) consumes about 50% of DM from on-farm produced forages:
  - 25% corn silage and
  - 25% alfalfa silage

Forage Source 35-Corn Silage-CoSi

RUP (%)	RDP (%)	A (%)	B (%)	C (%)	KD
3.08	5.7	51	30.2	18.5	4.4

Set

Forage Source 83-Alf Silage -Alsi

RUP (%)	RDP (%)	A (%)	B (%)	C (%)	KD
3.95	17.95	57.3	35.3	7.4	12.2

Set



# The IOFSC Application



III

## Set Source of Energy Supplements and Prices

Source	Price (\$/bu)	Upper Limit (lb)	
Corn Grain	4	15	Edit Row
Add Row			

RUP (%)	RDP (%)	A (%)	B (%)	C (%)	KD
4.31	5.09	23.9	72.5	3.6	4.9
Set					

- Corn grain is the major source of energy and contains:
  - 4.31% RUP
  - 5.09% RDP
  - 9.40% CP



# The IOFSC Application



16 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

IV

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

Product	Price (\$/ton)	Upper Limit (lb)	
106-Soybean Meal-SBM	300	15	Edit Row
25-Corn Gluten Meal-CGM	550	15	Edit Row
23-Corn Distiller Grains-CDG	200	15	Edit Row
<input type="button" value="Add Row"/>			

RUP (%)	RDP (%)	A (%)	B (%)	C (%)	KD
16.5	33.4	22.5	76.8	0.7	9.4
47.6	17.4	3.9	90.9	5.2	2.3
14.76	14.94	28.5	63.3	8.2	3.6

- **Three major sources of protein:**
  - **Nutritionist believes that 15 lb on each one is the maximum limit in a diet (cow/day)**





# The IOFSC Application



V

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

	Upper Limit	
RUP Rumen Undegradable Protein	6.5	% of Diet DM
RDP Rumen Degradable Protein	11.5	% of Diet DM
CP Crude Protein	18	% of Diet DM

Milk Price  \$/cwt



Maximize IOFSC

- Nutritionist believes maximum levels of CP, RUP, and RDP in diet:
  - CP = 18%, RUP = 6.5%, RDP = 11.5%
- Milk price = \$12/cwt



# The IOFSC Application



18 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

## Optimization Results

### Grains

Corn Grain	12.98 lb
------------	----------

### Proteins

106-Soybean Meal-SBM	1.8 lb
25-Corn Gluten Meal-CGM	0.0 lb
23-Corn Distiller Grains-CDG	10.37 lb

### RUP, RDP & CP

	Optimal
Rumen Undegradable Protein	6.5 %
Rumen Degradable Protein	11.5 %
Crude Protein	18.0 %

### Expected Milk Production & IOFSC

	Optimal
Expected Milk Production	80.3 lb/cow/day
Max IOFSC	7.4 \$/cow/day



# The IOFSC Application



19 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

## Corn Distiller @ \$300/ton

### Optimization Results

#### Grains

Corn Grain	15.0 lb
------------	---------

#### Proteins

106-Soybean Meal-SBM	2.79 lb
25-Corn Gluten Meal-CGM	0.59 lb
23-Corn Distiller Grains-CDG	6.77 lb

#### RUP, RDP & CP

	Optimal
Rumen Undegradable Protein	6.5 %
Rumen Degradable Protein	11.5 %
Crude Protein	18.0 %

#### Expected Milk Production & IOFSC

	Optimal
Expected Milk Production	80.3 lb/cow/day
Max IOFSC	6.97 \$/cow/day



# The IOFSC Application



20 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

## Corn Grain @ \$6/bu

### Optimization Results

#### Grains

Corn Grain	12.98 lb
------------	----------

#### Proteins

106-Soybean Meal-SBM	1.8 lb
25-Corn Gluten Meal-CGM	0.0 lb
23-Corn Distiller Grains-CDG	10.37 lb

#### RUP, RDP & CP

	Optimal
Rumen Undegradable Protein	6.5 %
Rumen Degradable Protein	11.5 %
Crude Protein	18.0 %

#### Expected Mi

	Optimal
Expected Milk Production	80.3 lb/cow/day
Max IOFSC	6.94 \$/cow/day



# Wisconsin Dairy Feed Evaluator



21 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

- Goal in each farm:

## SUMMARY

DMI (lb/cow/day)

MILK/DMI

FCM/DMI

ECM/DMI

PURCHASED FEED COST (\$/cow/day)

HOME GROWN FEED COST (\$/cow/day)

TOTAL FEED COSTS (\$/cow/d)

INCOME OVER PURCHASED FEED COSTS (IOPFC) (\$/cow/day)

INCOME OVER FEED COSTS (IOFC) (\$/cow/day)

	MILKING	DRY
DMI (lb/cow/day)	53.10	23.79
MILK/DMI	1.635	
FCM/DMI	1.515	
ECM/DMI	1.671	
PURCHASED FEED COST (\$/cow/day)	3.300	1.189
HOME GROWN FEED COST (\$/cow/day)	2.724	0.960
TOTAL FEED COSTS (\$/cow/d)	6.023	2.149
INCOME OVER PURCHASED FEED COSTS (IOPFC) (\$/cow/day)	6.049	
INCOME OVER FEED COSTS (IOFC) (\$/cow/day)	3.325	



# Wisconsin Dairy Feed Evaluator



22 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

- **General, Production, and Income Information**
  - **Farm and reporter identification**
  - **Milk and components**
  - **Price received for milk**

1	FARM INFORMATION				
1.1	Farm Name				
1.2	Person Reporting				
1.3	Month of Analysis				
1.4	Number of Cows	1051	MILKING	242	DRY
1.5	Milk Bulk Tank Production (lb/cow/day)	86.8			
1.6	Milk Butterfat (%)	3.51%			
1.7	Milk Protein (%)	3.50%			
1.8	Milk Price (\$/cwt)	10.77	<input checked="" type="radio"/> Farm/Mailbox <input type="radio"/> Standardized		
	MILK REVENUE (\$/cow/day)				9.35





# Wisconsin Dairy Feed Evaluator



- Ration Information
  - Ration group
  - Number of animals
  - Milking status

2 RATION GROUP INFORMATION		Name	Number	Milking?
2.1	Ration Group 1	Lactation 1	400	<input checked="" type="checkbox"/>
2.2	Ration Group 2	Lactation 2	583	<input checked="" type="checkbox"/>
2.3	Ration Group 3	Postfresh	68	<input checked="" type="checkbox"/>





# Wisconsin Dairy Feed Evaluator



25 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

- Forage in Diet
  - DM or As Fed
  - Homegrown or purchased
  - Amount of forage used by ration group

DM  (changing will reset the table)

3 FORAGE		DM (lb/cow/d) Ration Group									
↓-----Make Selections-----↓		P	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9
3.0	Alf. Silage-ALSi	<input type="checkbox"/>	14.80	16.37	10.45	4.67	-				
3.1	Corn Silage-CoSi	<input type="checkbox"/>	11.65	13.33	6.60	7.10	-				
3.2	Hay Forage-	<input type="checkbox"/>	1.70	1.70	2.98	-	-				
3.3	Straw	<input type="checkbox"/>	0.52	0.46	0.69	-	-				
3.4	Candy Hay	<input type="checkbox"/>	-	-	2.61	-	-				
3.5	Hoekstra hay	<input type="checkbox"/>	-	-	-	5.10	-				
3.6	Canary hay	<input type="checkbox"/>	-	-	-	3.78	-				
3.7	Sweet Corn Waste	<input checked="" type="checkbox"/>	-	-	-	-	9.50				
3.8	Bagged Haylage	<input type="checkbox"/>	-	-	-	-	5.87				
3.9	Canary hay	<input checked="" type="checkbox"/>	-	-	-	-	6.30				



# Wisconsin Dairy Feed Evaluator



26 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

- Energy/Protein in diet
  - DM or As Fed
  - Homegrown or purchased
  - Amount of energy/protein used by ration group

As Fed  (changing will reset the table)

4 ENERGY/PROTEIN SUPPLEMENTS			DM (lb/cow/d) Ration Group									
↓-----Make Selections-----↓			P	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9
4.0	Corn-CGG	<input type="checkbox"/>		6.14	7.46	7.20						
4.1	Barley-BGR	<input type="checkbox"/>										
4.2	Corn-CGG	<input type="checkbox"/>										
4.3	High Cows	<input checked="" type="checkbox"/>		15.49	15.85	9.75						
4.4	Permeate	<input checked="" type="checkbox"/>		9.00	9.00							
4.5	Distillers	<input checked="" type="checkbox"/>		6.75	6.75	5.20						
4.6	Prefresh	<input checked="" type="checkbox"/>					4.50					
4.7	Beet pulp	<input checked="" type="checkbox"/>				1.00	1.00					
4.8	Corn-CGG	<input type="checkbox"/>										
4.9	Barley-BGR	<input type="checkbox"/>										

17:56



# Wisconsin Dairy Feed Evaluator



27 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

- Minerals and Vitamins in Diet
  - Amount of Min-Vit used by ration group

6 MIN-VIT & ADDITIVE SUPPLEMENTS		DM (lb/cow/d) Ration Group								
↓-----Make Selections-----↓		2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9
6.0	BioSel			0.08						
6.1	Reshure			0.10						
6.2	Dry Cow Mineral					0.24				
6.3	Mag-Pot-Sulfate									
6.4	Mag-Pot-Sulfate									
6.5	Mag-Pot-Sulfate									
6.6	Mag-Pot-Sulfate									
6.7	Mag-Pot-Sulfate									
6.8	Mag-Pot-Sulfate									
6.9	Mag-Pot-Sulfate									



# Wisconsin Dairy Feed Evaluator



28 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

- Summary by Ration Group

	2.1 Lactation 1 Lact				2.4 Prefresh Dry			
	Purchased		Home grown		Purchased		Home grown	
	DMI	Cost	DMI	Cost	DMI	Cost	DMI	Cost
FORAGE	0.00	\$ -	28.67	\$ 2.19	0.00	\$ -	20.65	\$ 1.49
ENERGY/PROTEIN SUPPLEMENTS	18.48	\$ 3.30	4.24	\$ 0.39	5.00	\$ 1.43	0.00	\$ -
MIN-VIT & ADDITIVE SUPPLEMENTS	0.00	\$ -			0.00	\$ -		
TOTAL FEED	18.48	\$ 3.30	32.91	\$ 2.58	5.00	\$ 1.43	20.65	\$ 1.49
DMI (lb/cow/d)	51.38				25.64			
FEED COSTS (\$/cow/d)	\$ 5.88				\$ 2.91			
NUMBER OF COWS (#)	400				122			



# Wisconsin Dairy Feed Evaluator



29 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

## • Overall Farm Summary



MILKING		DRY		MILKING		DRY		MILKING		DRY	
53.10	23.79	53.10	23.79	53.10	23.79	53.10	23.79	53.10	23.79	53.10	23.79
1.635		1.635		1.635		1.635		1.635		1.635	
1.515		1.515		1.515		1.515		1.515		1.515	
1.671		1.671		1.671		1.671		1.671		1.671	
3.300	1.189	3.300	1.189	3.300	1.189	3.300	1.189	3.300	1.189	3.300	1.189
2.724	0.960	2.724	0.960	2.724	0.960	2.954	1.001	2.954	1.001	2.954	1.001
6.023	2.149	6.023	2.149	6.023	2.149	6.253	2.190	6.253	2.190	6.253	2.190
6.049		6.049		9.720		9.720		9.720		9.720	
3.325		3.325		6.997		6.997		6.767		6.767	

Farm Prices

Milk \$10.8→\$15

Milk \$10.8 →15  
 CornSi \$48 →50  
 Hay \$140 →150  
 CornGr \$127→150

### SUMMARY

DMI (lb/cow/day)  
 MILK/DMI  
 FCM/DMI  
 ECM/DMI  
 PURCHASED FEED COST (\$/cow/day)  
 HOME GROWN FEED COST (\$/cow/day)  
 TOTAL FEED COSTS (\$/cow/d)  
 IOPFC (\$/cow/day)  
 IOFC (\$/cow/day)

# Wisconsin Dairy Feed Evaluator

- **Other Summaries and Benchmarks**

- Reporter summary
- County summary
- Region summary
- State summary
  
- Historical summary





# Summary of Wisconsin IOFC



31 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

## • Jul-Sep Wisconsin Milk Revenue (n=16)

	Milking (#)	Dry (#)	Milk (lb/cow/d)	Butterfat (%)	Milk Price (\$/cwt)	Milk Revenue (\$/cow/d)
Min	37	0	62	3.50%	10.77	7.44
25%Tile	122	55	77	3.50%	11.38	9.15
Mean	487	108	83	3.60%	12.04	9.94
75%Tile	727	158	90	3.60%	12.04	10.46
Max	1286	247	100	3.90%	15.14	13.52



# Summary of Wisconsin IOFC



32 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

- Jul-Sep Wisconsin Dry Cow Feed Cost (n=16)

		DRY			
		8.6.2	8.9.2	8.10.2	8.11.2
			Purchased	Home Grown	Total
		DMI	Feed Cost	Feed Cost	Feed Costs
		(lb/cow/day)	(\$/cow/day)	(\$/cow/day)	(\$/cow/d)
	Min	22.55	0.23	0.74	1.89
	25%Tile	25.86	0.55	0.90	2.05
	Mean	28.67	1.13	1.28	2.42
	75%Tile	30.65	1.38	1.60	2.60
	Max	38.25	2.93	1.81	3.67





# Summary of Wisconsin IOFC



33 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

- July-Sep Wisconsin IOFC (n=16)

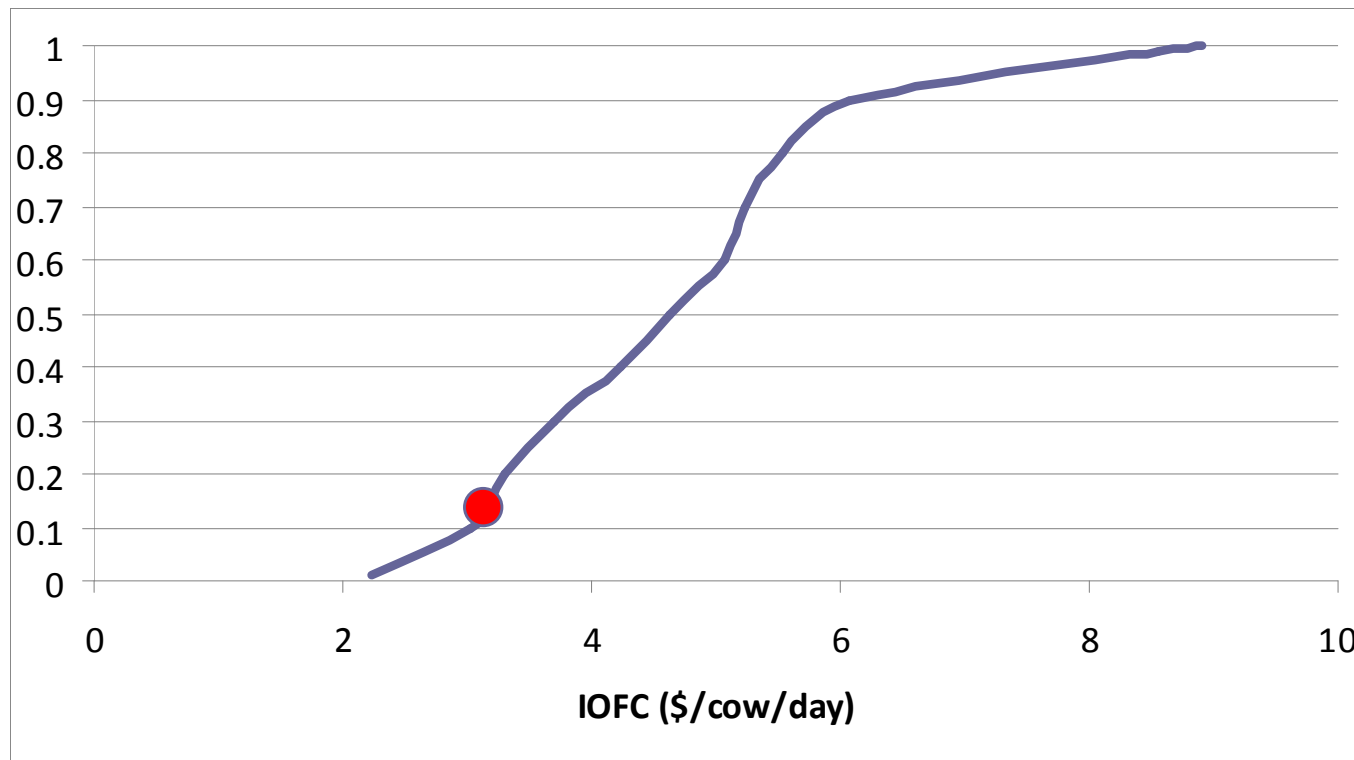
	MILK							
	8.6.1	8.7.1	8.8.1	8.9.1	8.10.1	8.11.1	8.12.1	8.13.1
				Purchased	Home Grown	Total	Income Over	Income Over
	DMI			Feed Cost	Feed Cost	Feed Cost	Purchased Feed Cost	Feed Cost
	(lb/cow/day)	MILK/DMI	FCM/DMI	(\$/cow/day)	(\$/cow/day)	(\$/cow/d)	OPFC) (\$/cow/day)	(IOFC) (\$/cow/day)
Min	46.82	1.23	1.14	0.00	1.26	3.89	3.36	2.10
25%Tile	51.14	1.42	1.30	1.80	1.76	4.61	5.98	3.49
Mean	53.86	1.54	1.42	2.60	2.58	5.29	7.22	4.66
75%Tile	56.82	1.68	1.56	3.53	3.05	6.02	8.40	5.33
Max	62.96	1.91	1.75	4.44	4.93	6.58	10.90	8.91



# Benchmark of Wisconsin IOFC



- Farm #5: \$3.13, 13.3%



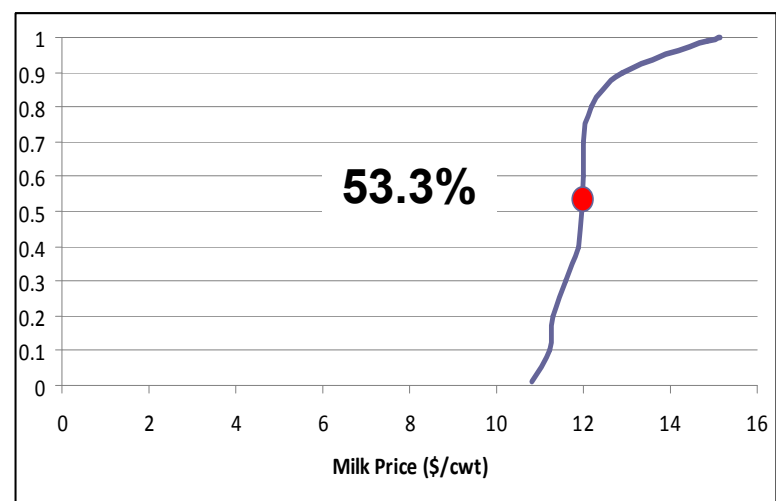
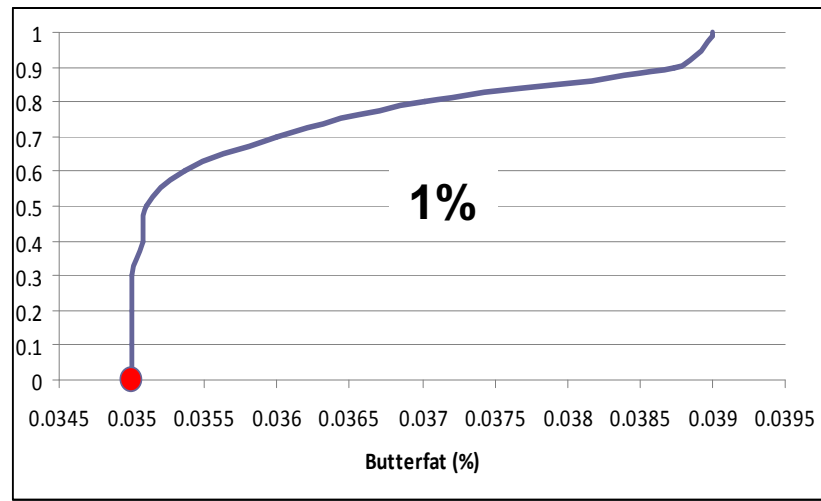
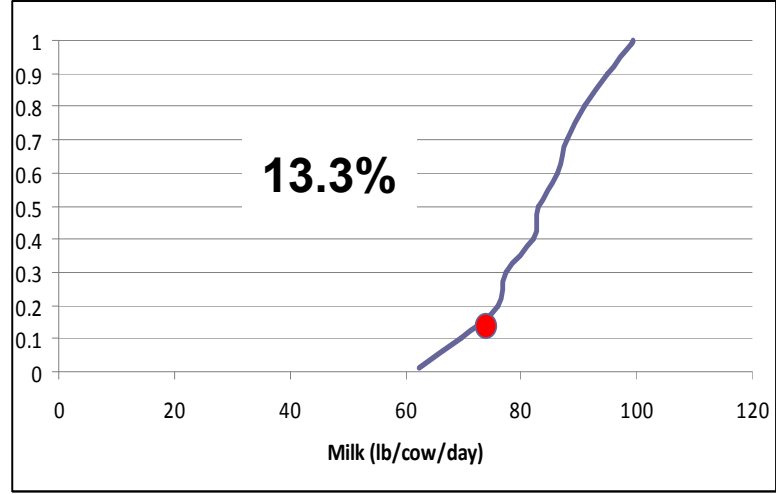
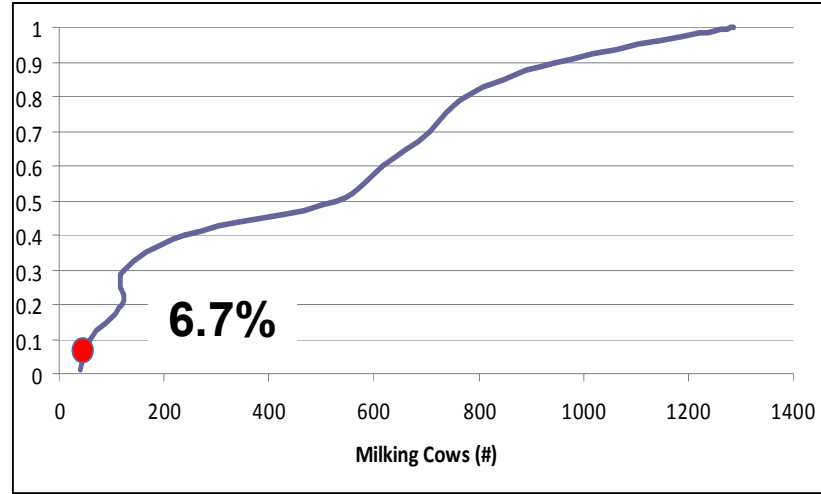


# Benchmark of Wisconsin IOFC



## • Farm #5: \$3.13, 13.3%

35 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009

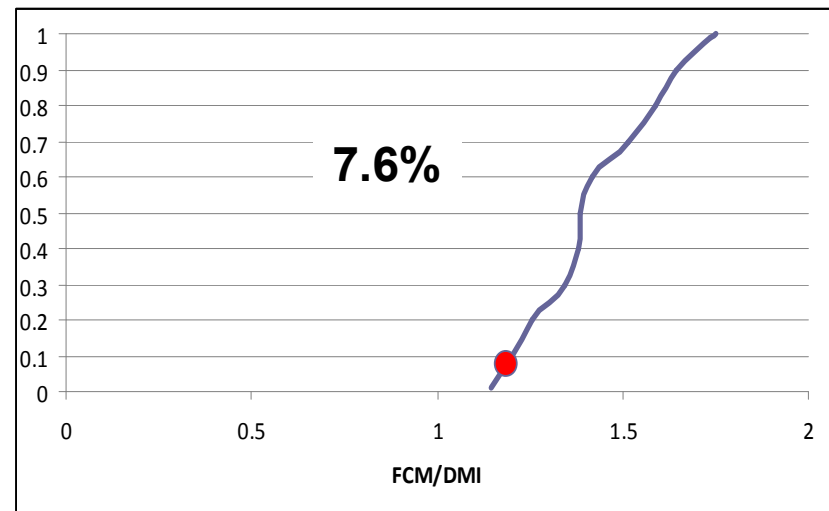
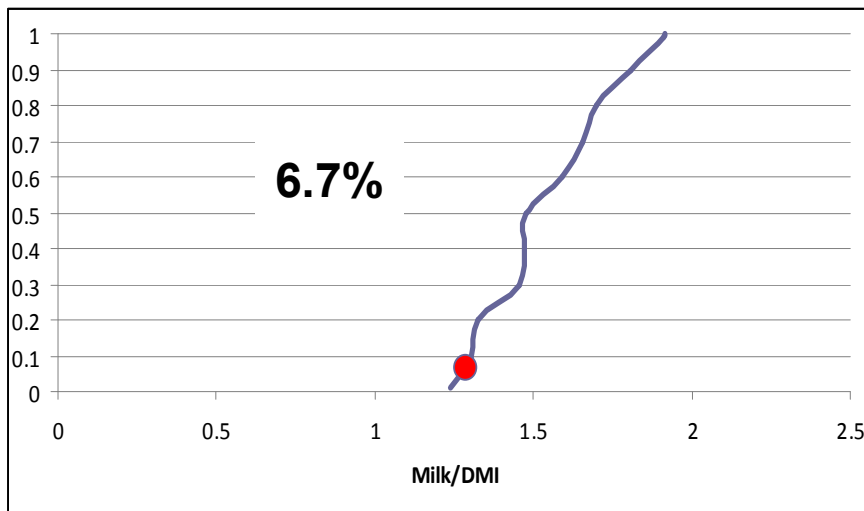
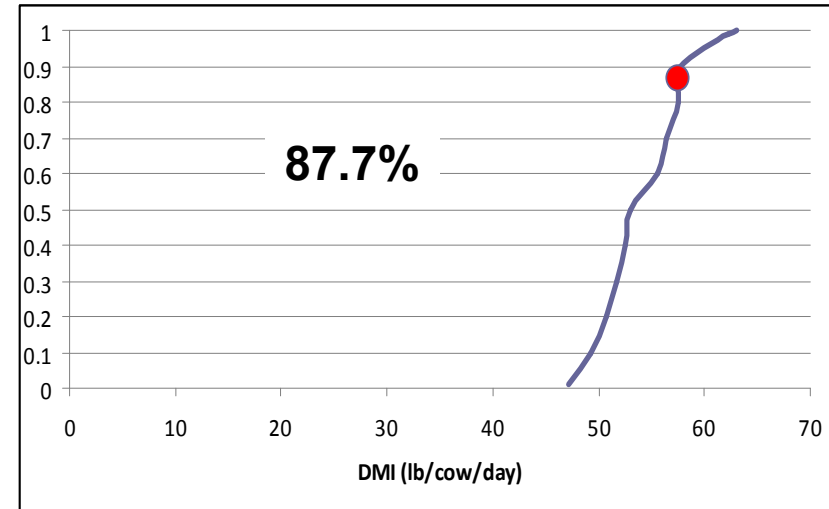
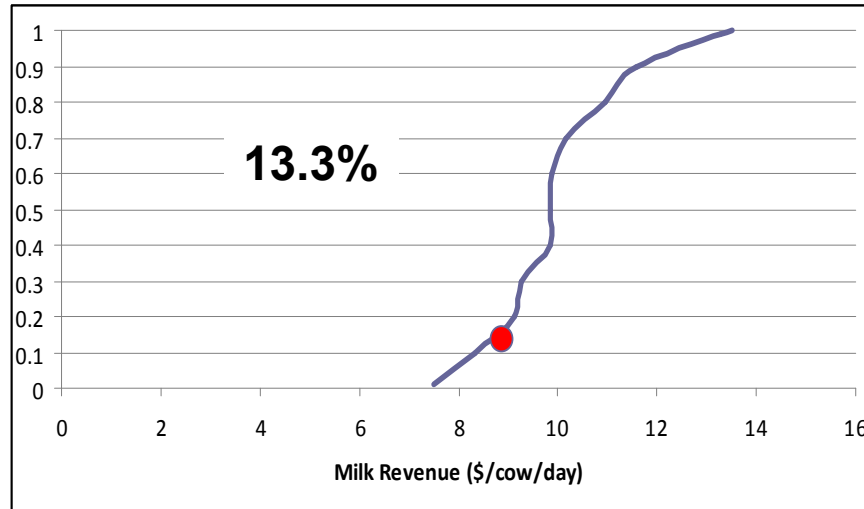




# Benchmark of Wisconsin IOFC



- Farm #5: \$3.13, 13.3%

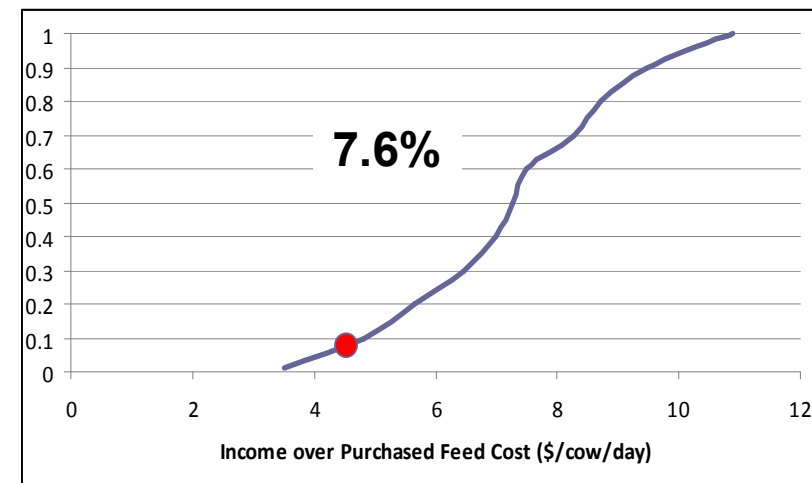
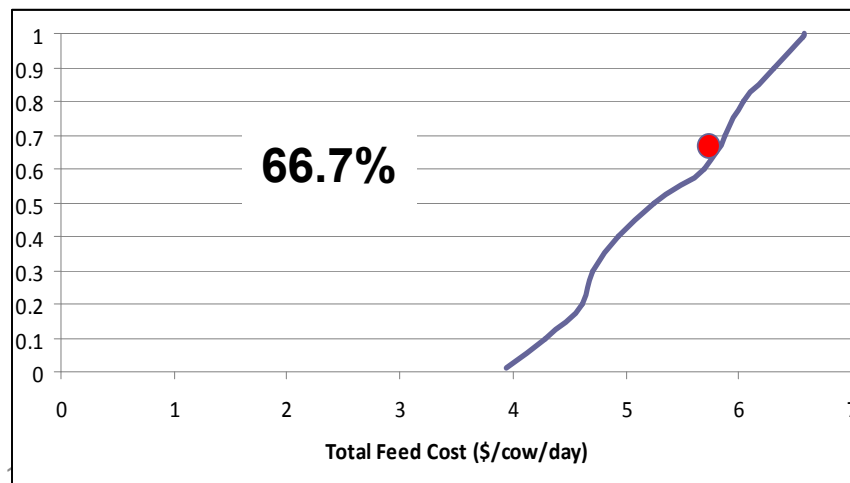
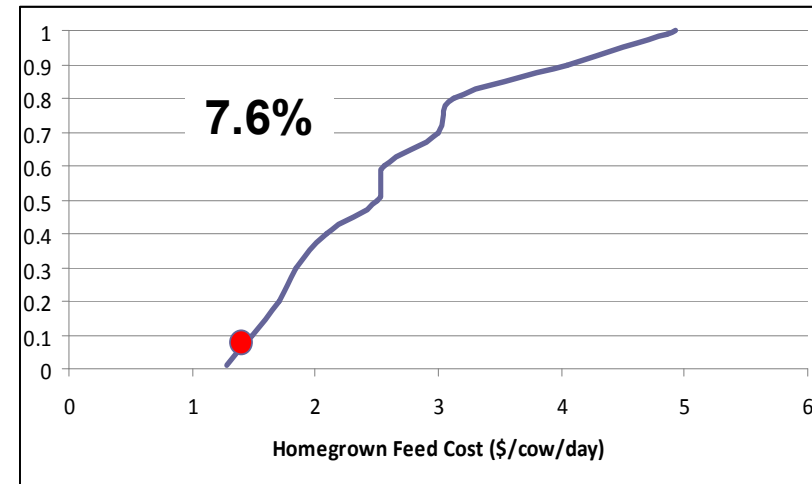
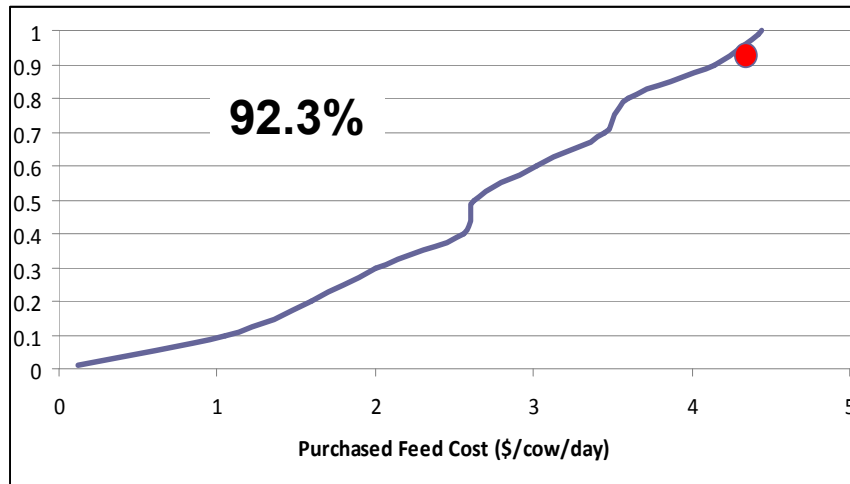




# Benchmark of Wisconsin IOFC



- Farm #5: \$3.13, 13.3%





# THANKS



38 Victor E. Cabrera, Dairy Ration Economics, 4 December 2009



Resources: Wisconsin  
Dairy Management Webpage  
<http://www.uwex.edu/ces/dairymgt/>

17:56