

# Dairy Farm Inputs: Enhancing Economic Efficiency

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Midwest  
Agriculture  
Conference



FEDERAL RESERVE BANK *of* CHICAGO

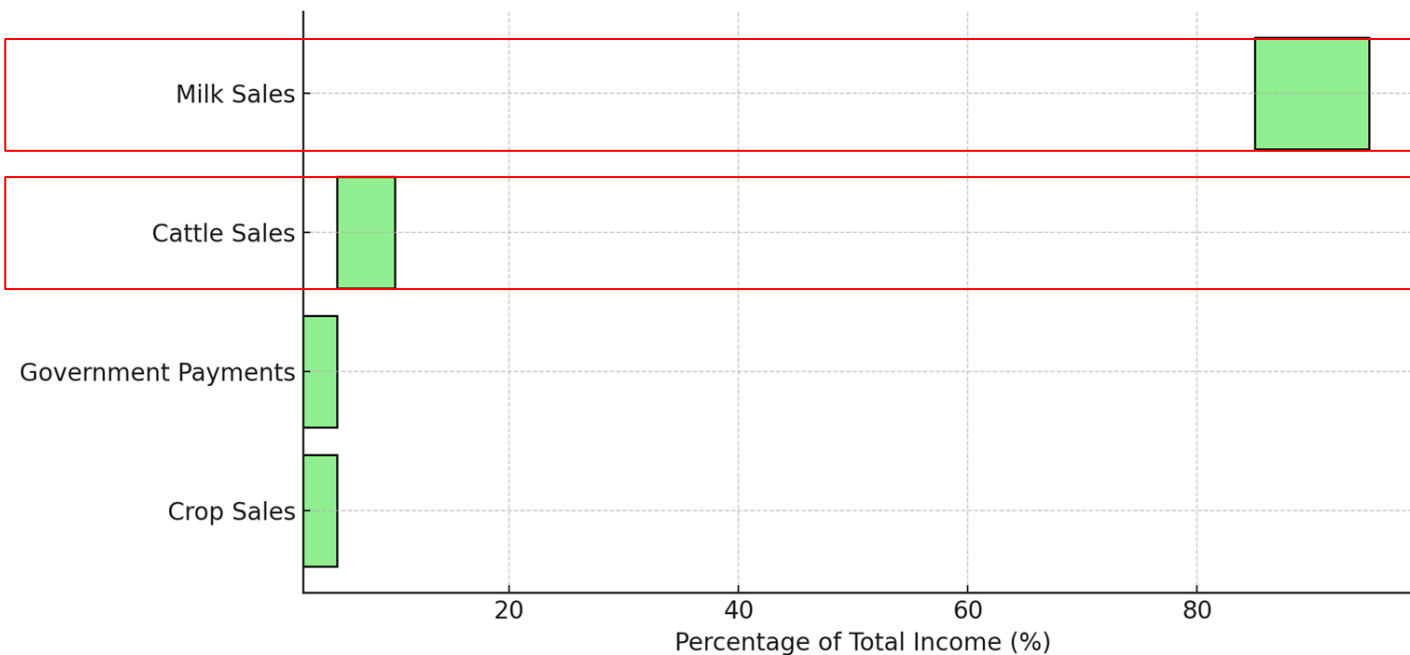


THE CHANGING LANDSCAPE  
FOR AGRICULTURAL INPUTS

TUESDAY, DECEMBER 3, 2024

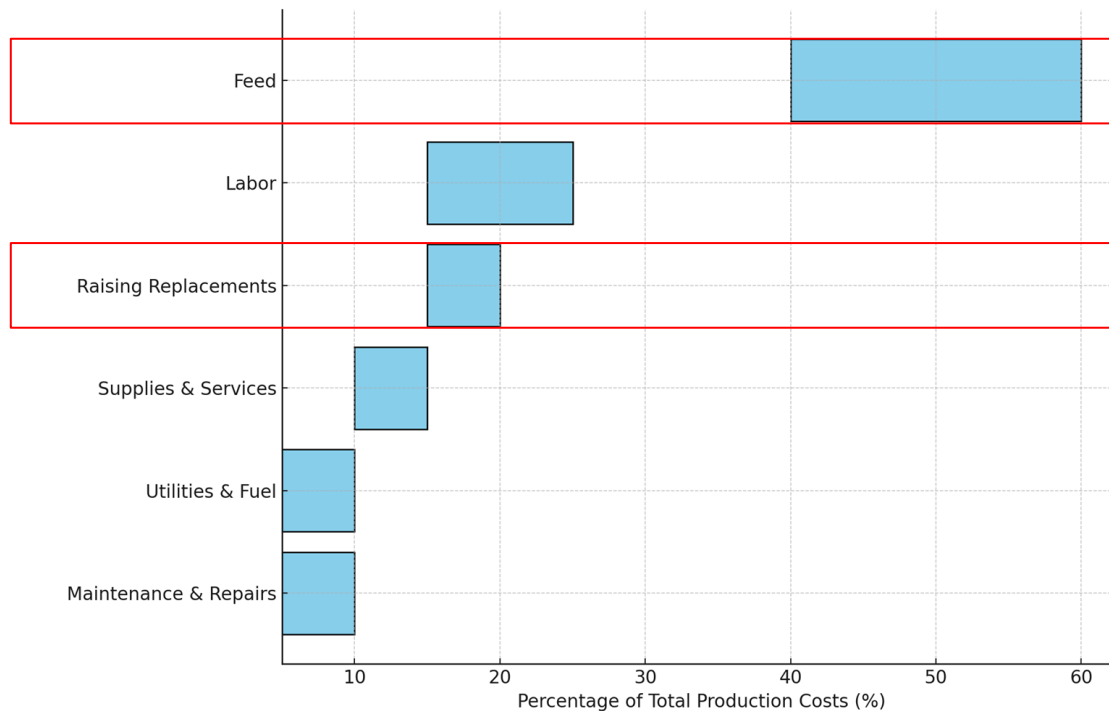


# Income Sources





# Production Costs: INPUTS





# Opportunities for Improvement

**Nutritional Grouping to  
Decrease Feed Input Costs**

Leverage

**Feed Costs  
Milk Sales**

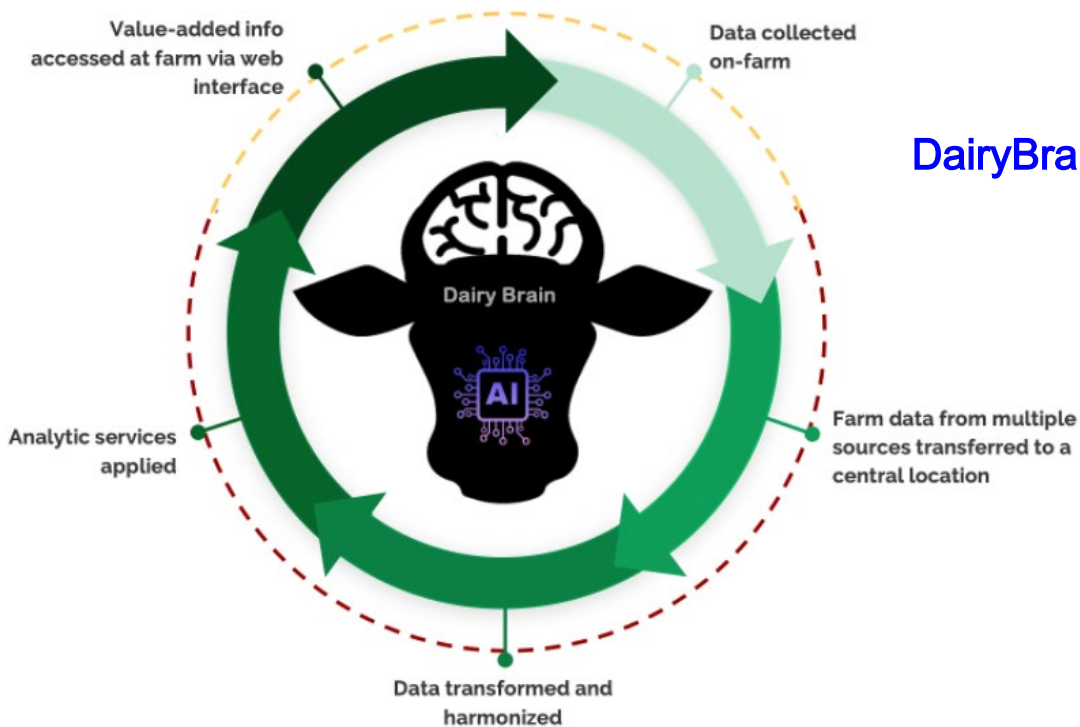
**Produce Crossbred Beef  
Calves to Decrease Raising  
Costs and Increase Income**

Leverage

**Cattle Sales  
Raising Replacements**

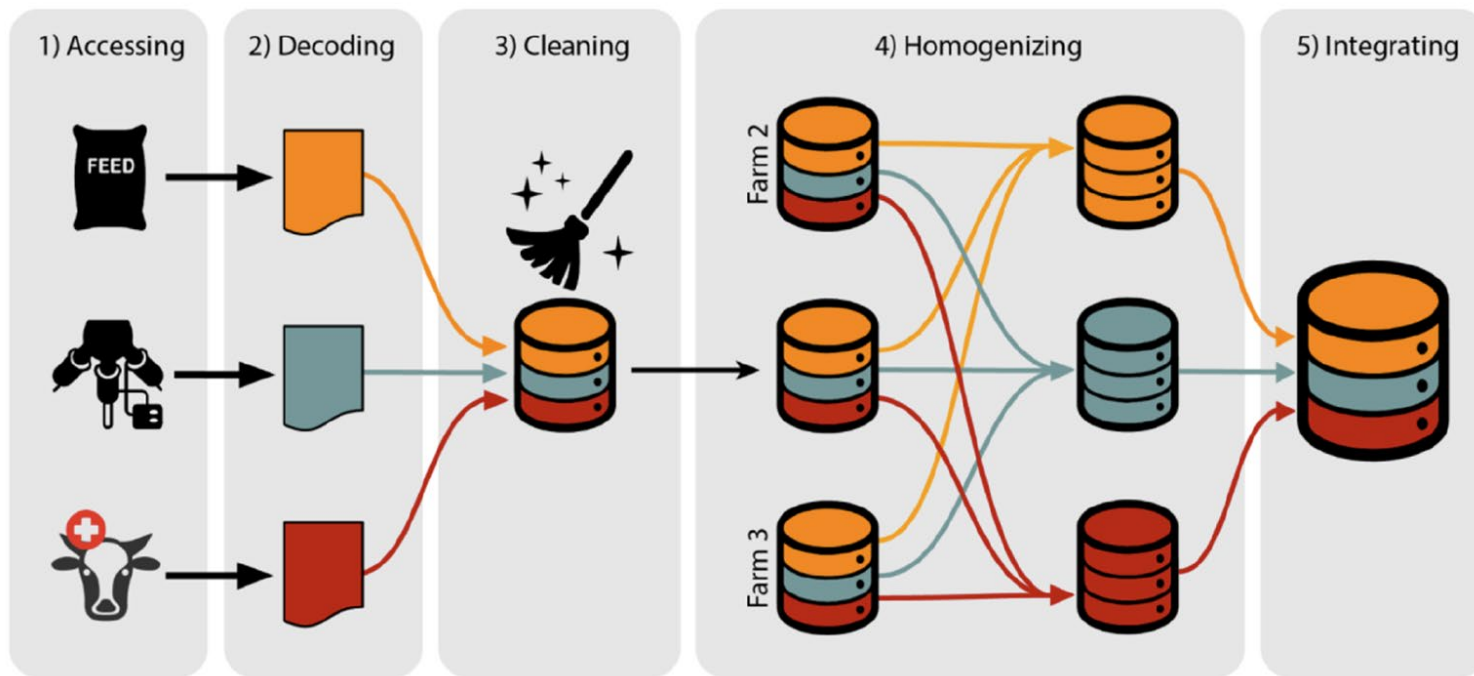


# Data - Driven Decision Making



[DairyBrain.wisc.edu](https://DairyBrain.wisc.edu)

# Data Integration is Critical





# Nutritional Grouping

## Nutritional Accuracy

Continual process of providing **adequate** nutrients to maintain economic and environmental sustainability

Cerosaletti and Dewing, 2008

Ideal would be to feed each cow individually = **Precision Feeding**

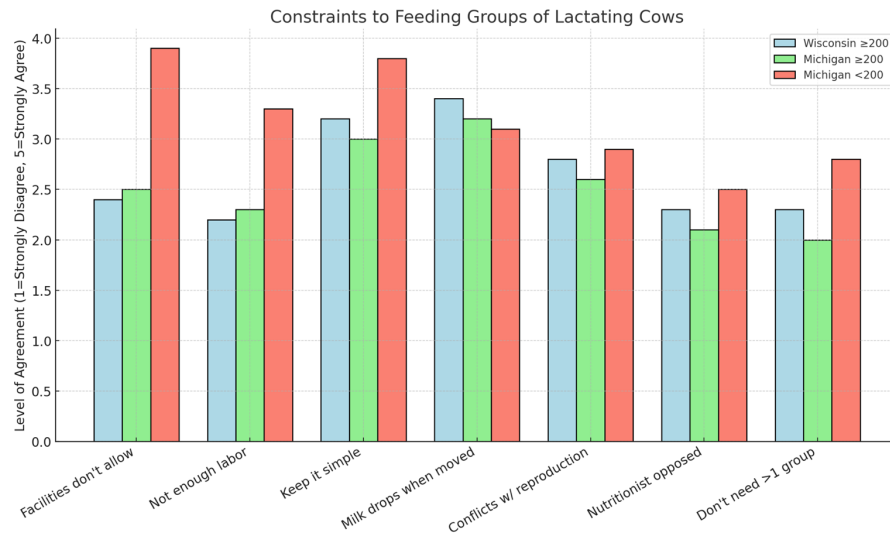




# How Farmers Feed Cows

One **TMR** (Total Mixed Ration) is standard: e.g., most or all lactating cows receive the exact same diet

**58%** of Wisconsin and Michigan farms feed one TMR all lactating cows



Contreras-Govea et al., 2015





# One TMR

Prefer to formulate for the  
**highest -performing** cows

Prefer erring on the side of  
**overfeeding** most of the cows

Unnecessary extra **FEED**  
**INPUTS** costs



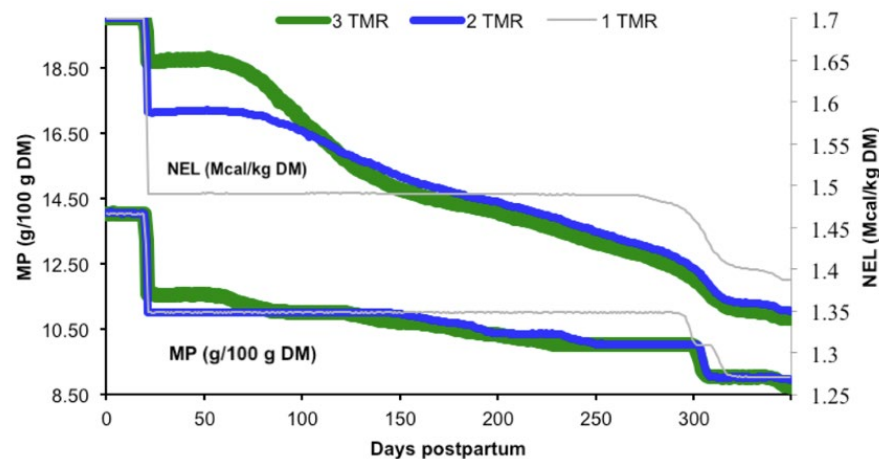


# Consequences of one TMR

Increased proportion of **over-conditioned** cows

Exacerbated nutrient balances **mismatches**

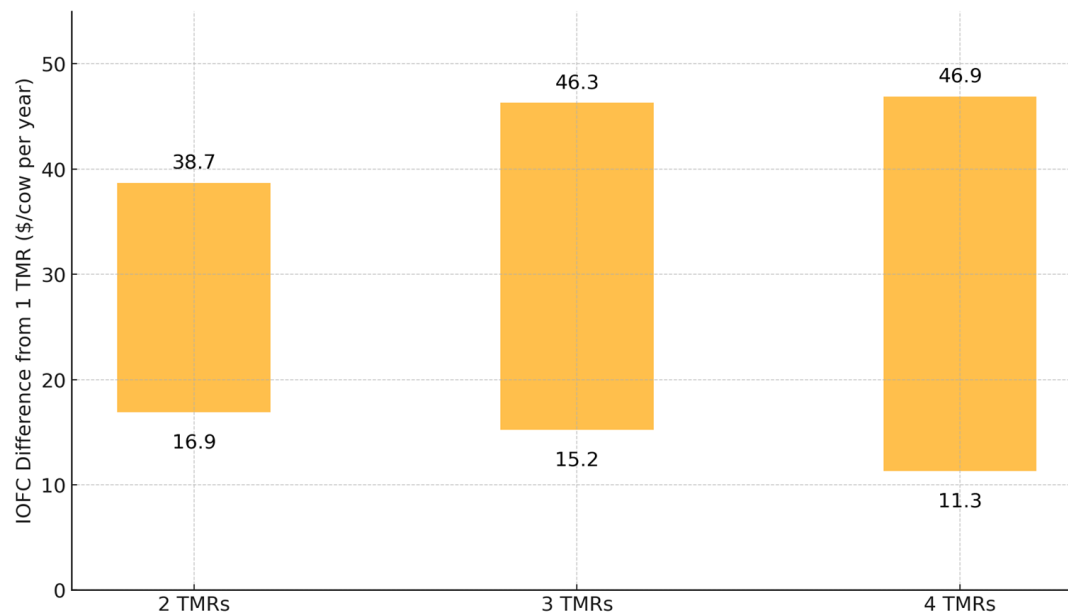
Greater waste and **environmental emissions**



Kalantari et al., 2016



# IOFC Improvement

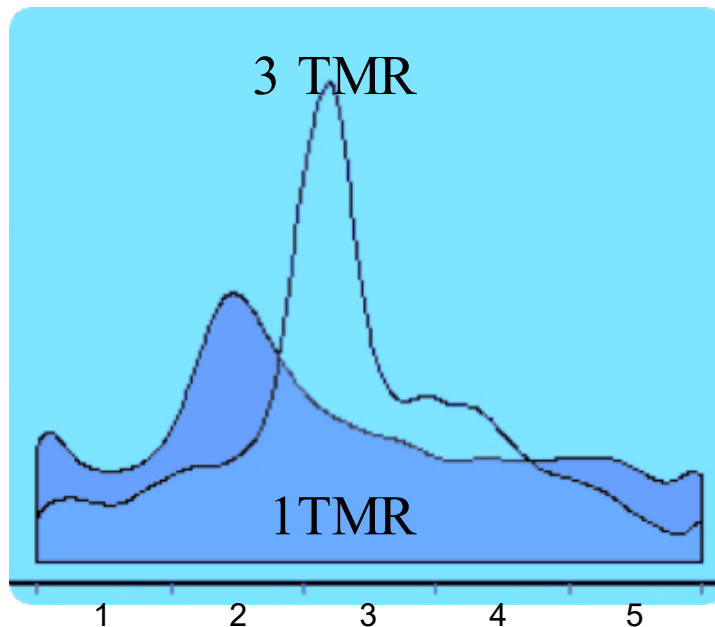


IOFC= Income Over Feed Cost on 5 Wisconsin dairy farms



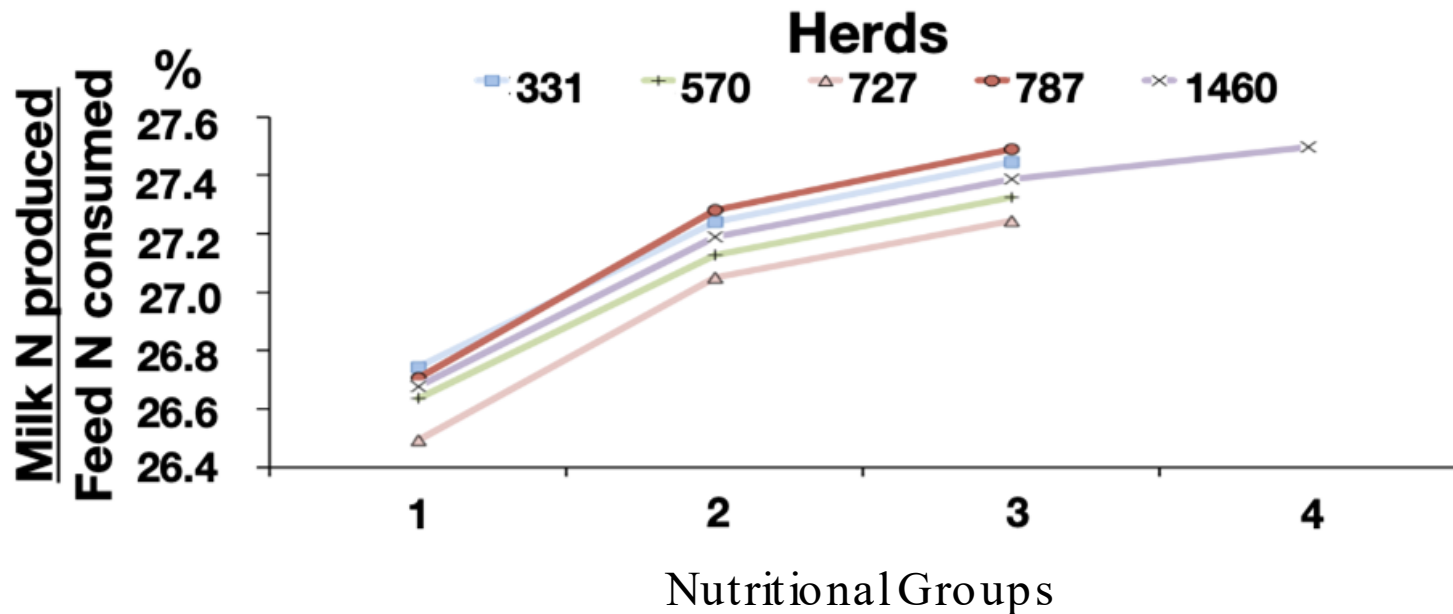
# Health Improvement

Body  
Condition  
Score (BCS)





# Environmental Improvement





# Precision Nutrition

Systematize and **automatize**

**Facilitate** the implementation of nutritional grouping

Decrease **errors**

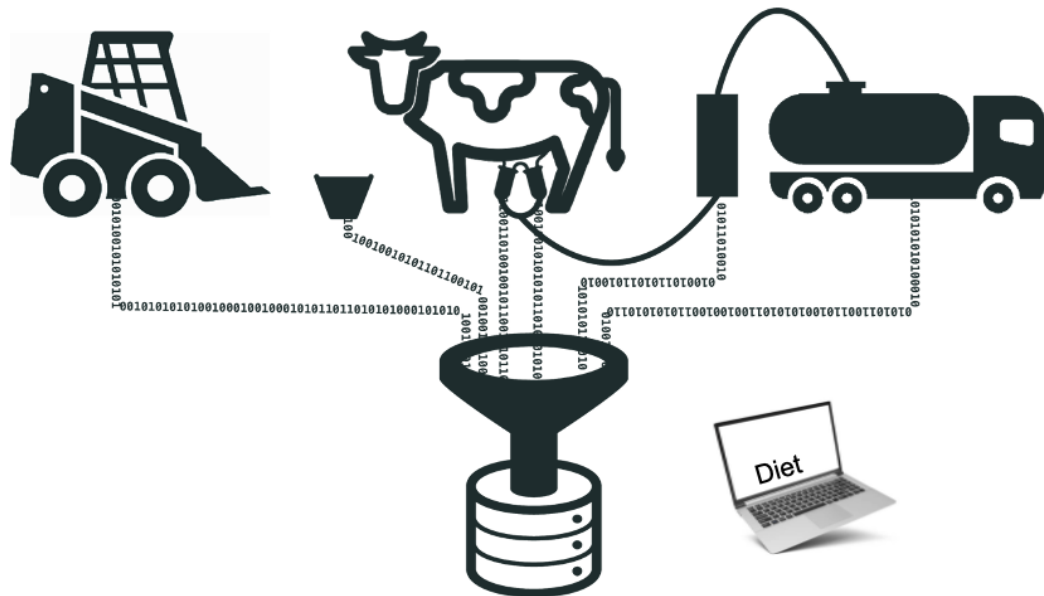
Foster more **accurate** diets



Cabrera et al., 2020

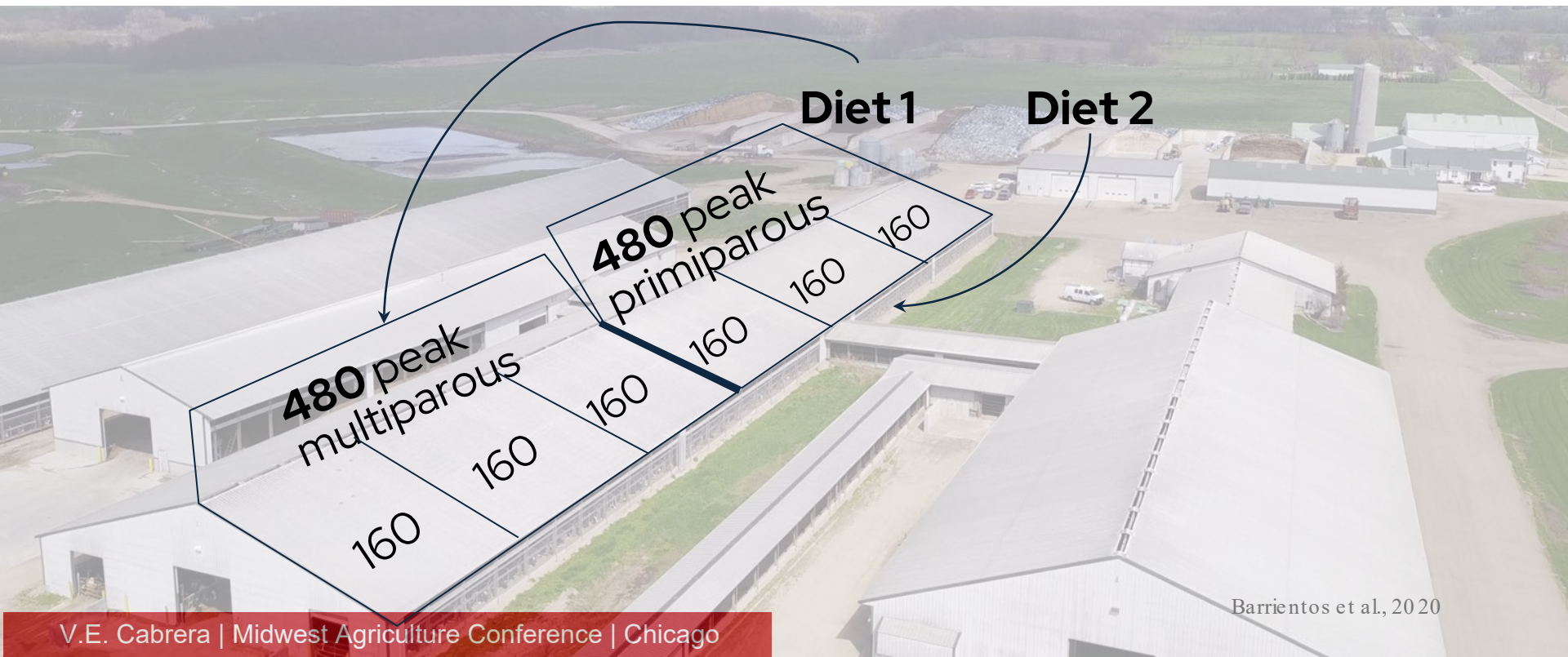


# Farm Specific





# Farm Specific



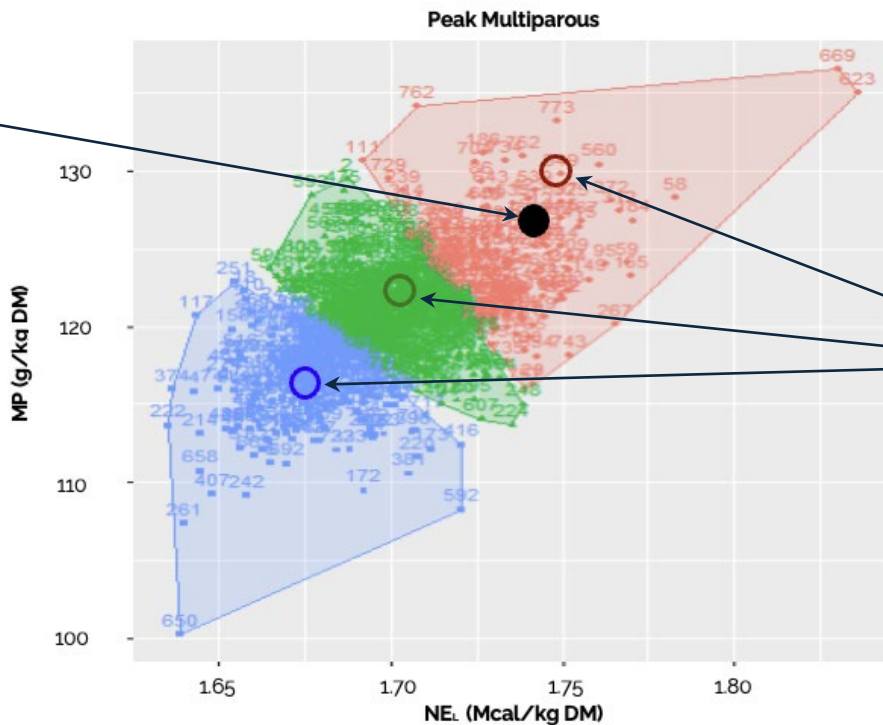
Barrientos et al., 2020





# Large Nutrient Mismatch

Diet 1



Proposed  
Diets

Barrientos et al., 2020



# Feed Input Savings (Gain)

Pen	Parity	Diet Cost (\$/cow per day)		Gain
		Current Practice	Proposed Practice	\$/cow per day
1	1		8.19	+0.60
2	1	8.79	8.63	+0.16
3	1		9.10	-0.31
4	2+		9.72	+0.60
5	2+	10.32	10.04	+0.28
6	2+		10.52	-0.20
Overall Gain				\$202 / cow.year



# Nitrogen Emissions Saved (Gain)

Pen	Parity	N supplied in diet (g/cow per d)		Gain
		Current Practice	Proposed Practice	g N/cow per day
1	1		609	-111
2	1	721	684	-37
3	1		755	+34
4	2+		700	-89
5	2+	789	749	-40
6	2+		826	+37
Overall Gain				-75 kg N/cow.year



# Nutritional Grouping

Increases **Feed Efficiency**  
Decreases **Feed Costs**  
Decreases **Nutrient Emissions**  
Possibly:

- **Increases productivity**
- **Enhances cows' health**

# Highlights

Important to setup farm specific automated system to inform nutritional strategies towards **Nutritional Accuracy**

There is a decision support tool available at:

<https://DairyMGT.info>: Tools  
Grouping Strategies for Feeding  
Lactating Dairy Cattle



# Produce Crossbred Beef Calves

## Dairy situation

Improved **reproduction**

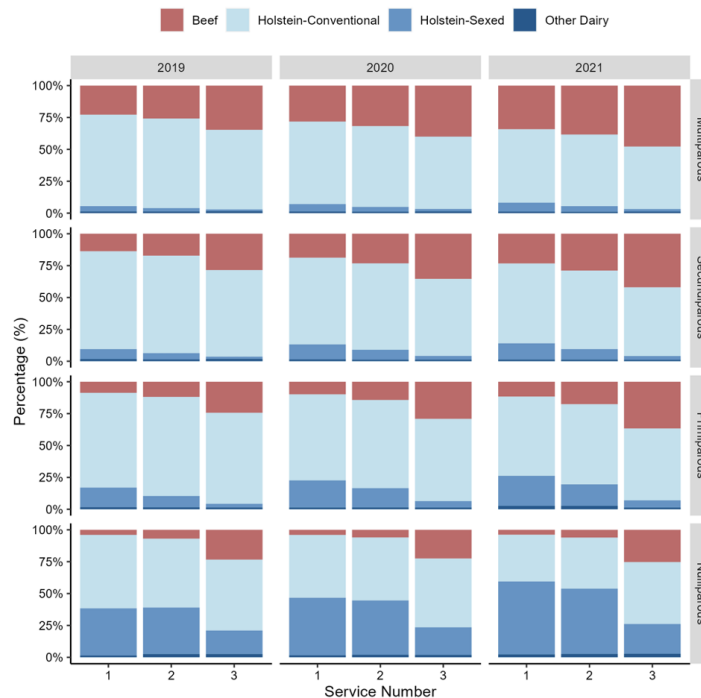
More dairy **sexed semen** use

Depressed **margins**

**Genetic** improvement

(Excess **replacements** )

Cabrera, 2019



Lauber et al, 2023



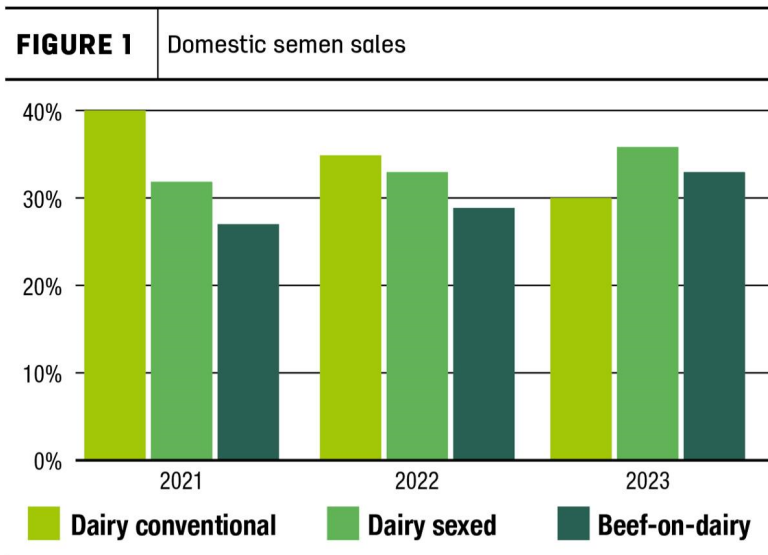
# Produce Crossbred Beef Calves

## Beef situation

Attractive beef **prices**

Economic **benefits**

**Genetic** improvement

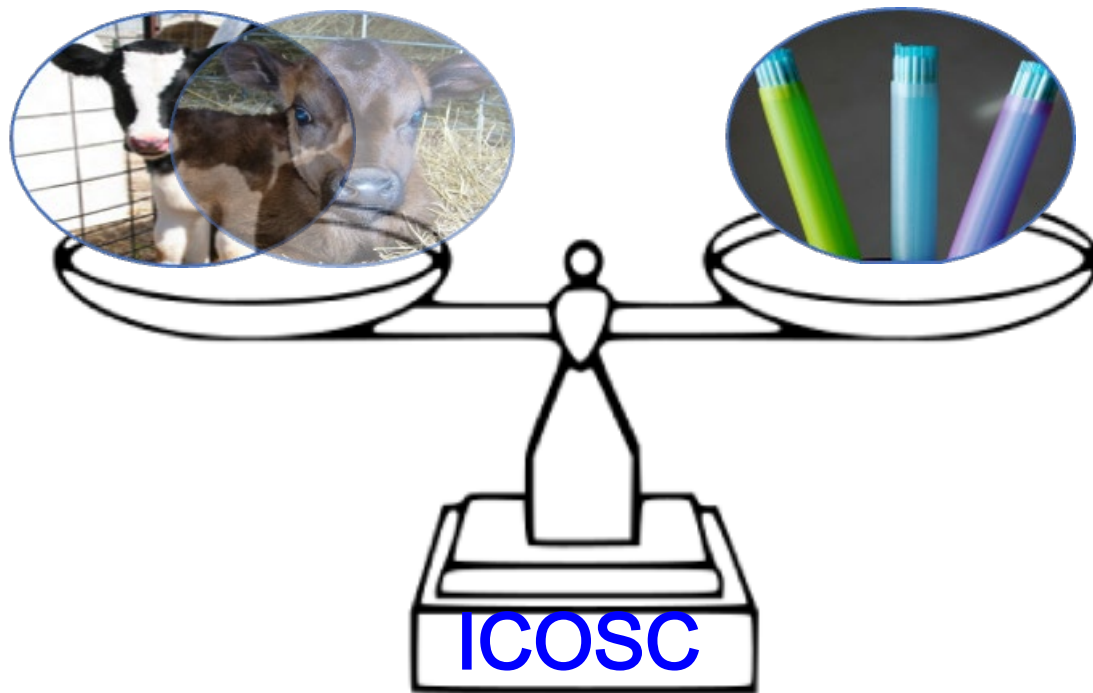


Source: USDA NASS Milk Production Report.

Cabrera, 2019

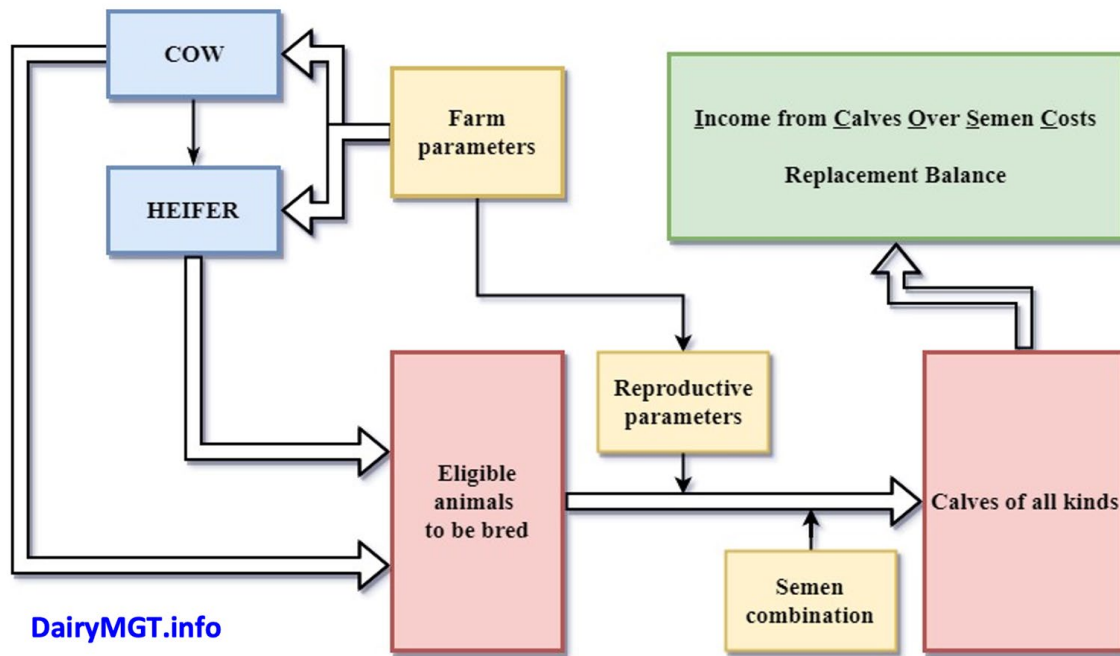


# Income from Calves Over Semen Cost





# Premium Dairy x Beef Program







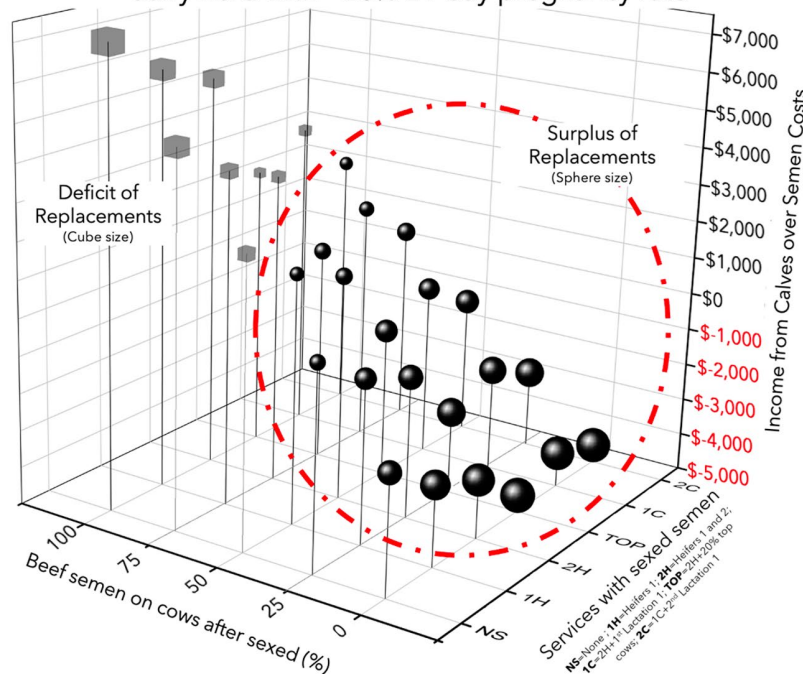
# Finding an Optimal ICOSC

Dairy and crossbred calf prices continue to climb

Everything the same, today:

**No brainer**

Value proposition of beef and sexed semen combinations on a dairy herd with ~20% 21-day pregnancy rate



Crossbred: **\$700**

Dairy: **\$225**

\$33,286

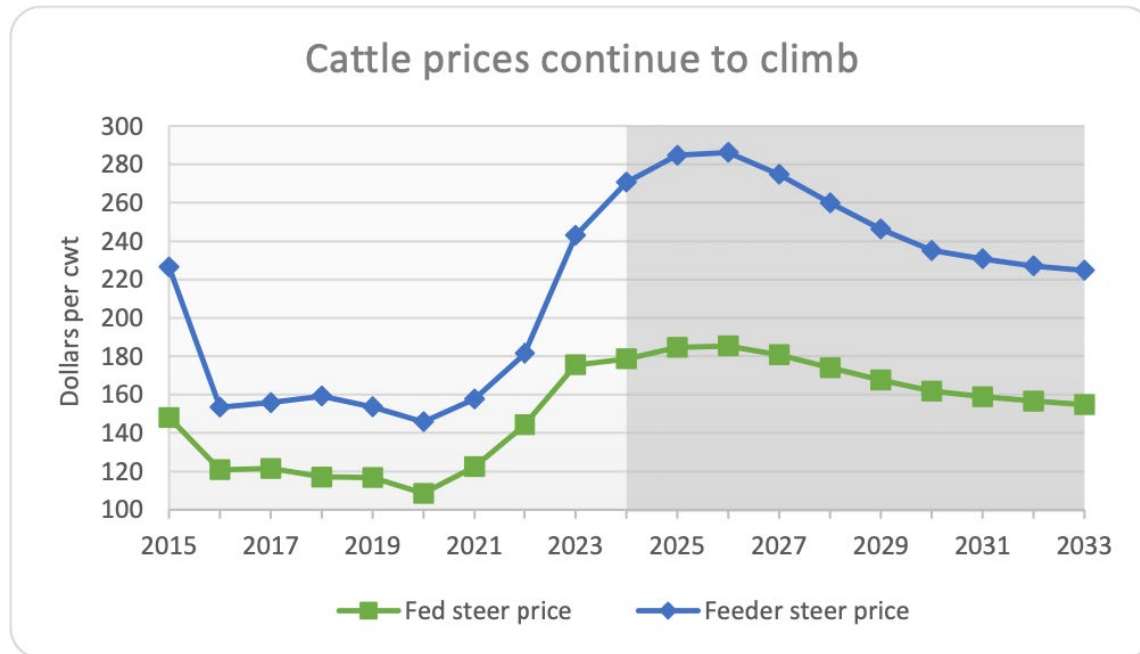
\$27,613

\$18,092

\$4,696



# Dairy x Beef in the Next 10 Years





# Dairy x Beef Highlights

More valuable when:

- Greater **reproductive performance**
- Crossbred calves have **higher price** than dairy calves
- Used in combination with **sexed semen**

More advantageous **if** opportunity and willingness to buy and sell dairy calves exist

There is a decision support tool available at:

**<https://DairyMGT.info>**: Tools  
**Premium Beef on Dairy Program**

# Thanks

