

## Is MIRG Economically Competitive?

Presented by: Tom Kriegl  
Farm Financial Analyst Emeritus  
University of Wisconsin Extension and  
Center for Dairy Profitability  
Website: [cdp.wisc.edu](http://cdp.wisc.edu)



NRCS/UWEX  
Mauston, WI  
March 4, 2014

## Wisconsin Dairy Farm Systems

- Before 1990, WI had one dairy system
- **Small confinement system** still most common Wisconsin dairy system— the size that a husband, wife and children can operate with their labor. Cows are housed and milked in stanchions or tie stalls and fed mechanically harvested feed.

What Wisconsin dairy producers want to know about the economic impact of choosing a system:

- How economically competitive are the dairy systems?
- How long will it take to attain the goal?
- What will it cost to attain the goal?

## Is MIRG Economically Competitive?

- There will never be a study that will show that any one system will be economically superior to all other systems under all circumstances for all time.
- So is **Management Intensive Rotational Grazing (MIRG)** economically competitive?
- Short Answer – Yes!

## Wisconsin Dairy Farm Systems

About 1990 three "new systems" appeared in Wisconsin

1. **Large Confinement** – cows housed inside, milked in parlors and fed mechanically harvested feed all year. Lack of land base requires some purchased feed. Most labor is hired.
2. **Management Intensive Rotational Grazing (MIRG)** – "family sized", cows milked in parlors but housed inside and fed mechanically harvested feed in non pasture season. Feed but not raise grain.
3. **Organic** – "family sized", cows are grazed enough to meet organic standards but otherwise are milked and housed in stanchion barns and fed mechanically harvested feed grown on the farm.

## Non-GRAZIER'S Early MYTHS/CLAIMS about GRAZING

1. Grazing is old fashioned
2. Grazing = Seasonal calving/ milking
3. Grazing is hobby farming
4. Grazing means no stored feed
5. Each paddock must be permanently fenced
6. Each paddock must be clipped after each grazing
7. cows won't produce on pasture
8. Grazing unprofitable

## GRAZING MYTHS BY NON-GRAZERS

- Grazing is old fashioned, backwards, etc.
- Grazing is not profitable
- Grazing requires seasonal calving
- Grazing requires permanent fencing around every acre
- Grazing may be OK to start with, until one can afford a real system

## Actual whole farm financial data:

- 6 years Great Lakes Grazing Network data (2000-2005) (639 farm years data)
- 14 years (1999-2012) limited Wisconsin organic data (150 farm years)
- 18 years (1995-2012) Wisconsin grazing (341 farm years) and confinement (9,815 farm years) data

## Great Lakes Grazing Network Financial Summary

- USDA IFAFS Grant
- Standardize Data Handling & Analysis
- Pool Actual farm financial data from
  - Illinois
  - Indiana
  - Iowa
  - Michigan
  - Minnesota
  - Missouri
  - New York
  - Ohio
  - Ontario
  - Pennsylvania
  - Wisconsin
- Use AgFA

## GRAZING MYTHS of GRAZERS

1. Financial benchmarks entirely different between grazing and not grazing
2. Farming and dairy experience detrimental to MIRC success
3. Grazing is opposite of confinement
4. Lower inputs = higher profits
5. Seasonal calving/ milking more profitable
6. Holsteins less profitable than other breeds for grazing
7. Reduced vet and medicine makes grazing more profitable
8. Grazing more profitable without grain
9. Increased grain prices will favor graziers economically

## Much Wisconsin Data Collected By:

- Fox Valley Farm Management Association
- Lakeshore Farm Management Association
- Wisconsin Farm and Business Management Incorporated
- UW EX Agents and Vo-Tech Instructors
- U. W. Center For Dairy Profitability

## Other Data From

- Frazer LLP
- Genske, Mulder & co. LLP
- Cornell University
- Michigan State University
- University of Minnesota Finbin
- University of Maryland---Johnson
- University of Vermont and University of Maine
- University of Florida DBAP
- Virginia Tech University---Whittle and Groover

## Stages of Organic Production

1. Pre-organic
2. Transitional organic
3. Certified organic
4. Certified market organic

Few farms supplied before and after data.

## Wisconsin Organic Participants

First Year Organic Price	Number of Farms
1994	4
1995	1
1996	1
1997	1
1999	3
2001	1
2003	2
2004	2
2005	2
2006	1

Year started farming ranged from 1977 to 2003.

## Comparing Milk Price: Organic vs. Grazier vs. Confinement

Year	Organic		Graziers		Confinement	
	Milk Price	Milk Price	Milk Price	Milk Price	Milk Price	Milk Price
1999	\$18.12	\$15.10	\$15.10	\$14.71	\$14.71	\$14.71
2000	\$18.33	\$12.38	\$12.38	\$12.21	\$12.21	\$12.21
2001	\$19.86	\$15.41	\$15.41	\$14.96	\$14.96	\$14.96
2002	\$19.21	\$12.55	\$12.55	\$12.66	\$12.66	\$12.66
2003	\$19.40	\$14.01	\$14.01	\$12.92	\$12.92	\$12.92
2004	\$19.99	\$17.29	\$17.29	\$16.72	\$16.72	\$16.72
2005	\$21.17	\$17.09	\$17.09	\$15.95	\$15.95	\$15.95
2006	\$23.98	\$13.72	\$13.72	\$13.68	\$13.68	\$13.68
2007	\$26.37	\$19.65	\$19.65	\$18.67	\$18.67	\$18.67
2008	\$26.85	\$20.26	\$20.26	\$19.19	\$19.19	\$19.19
2009	\$26.44	\$14.00	\$14.00	\$13.42	\$13.42	\$13.42
2010	\$26.26	\$17.07	\$17.07	\$16.33	\$16.33	\$16.33
2011	\$27.36	\$20.77	\$20.77	\$20.08	\$20.08	\$20.08
2012	\$29.57	\$20.54	\$20.54	\$19.48	\$19.48	\$19.48
Average	\$23.07	\$16.42	\$16.42	\$15.78	\$15.78	\$15.78

## Dairy Grazier Defined

- Milks Cows for living
- Cows move at least every third day
- Harvest 30% of forage needs by grazing
- 85% of gross income from milk sales or
- 90% of gross income from milk & cattle sales

## Wisconsin Organic Participants

Year	Wisconsin Organic Participants	
	Wisconsin Organic Farms	Wisconsin Organic and Graze
1999	6	2
2000	8	2
2001	8	4
2002	8	4
2003	12	8
2004	11	7
2005	17	12
2006	15	8
2007	15	9
2008	16	12
2009	14	10
2010	16	12
2011	15	13
2012	11	9

## Comparing Lbs. of Milk Sold per Cow: Organic vs. Grazier vs. Confinement

Year	Organic		Graziers		Confinement	
	Lbs Milk Sold/Cow	Lbs Milk Sold/Cow	Lbs Milk Sold/Cow	Lbs Milk Sold/Cow	Lbs Milk Sold/Cow	Lbs Milk Sold/Cow
1999	15,260	15,374	15,374	20,210	20,210	20,210
2000	15,282	16,083	16,083	20,546	20,546	20,546
2001	14,256	15,644*	15,644*	20,454	20,454	20,454
2002	14,923	15,644*	15,644*	20,858	20,858	20,858
2003	13,555	15,796	15,796	21,346	21,346	21,346
2004	14,174	16,526	16,526	21,277	21,277	21,277
2005	13,806	16,700	16,700	21,815	21,815	21,815
2006	14,425	15,849	15,849	22,149	22,149	22,149
2007	14,427	16,261	16,261	21,994	21,994	21,994
2008	13,989	14,669	14,669	22,128	22,128	22,128
2009	14,063	15,583	15,583	22,637	22,637	22,637
2010	13,428	17,079	17,079	22,650	22,650	22,650
2011	12,493	14,840	14,840	22,801	22,801	22,801
2012	14,205	15,863	15,863	23,570	23,570	23,570
Average	14,163	15,851	15,851	21,745	21,745	21,745

## Profitability VS Satisfaction

- Defining the Terms
  - Profit – Accounting & Economic Term
    - Most important business goal
  - Satisfy – combines business and personal goals

### • NFIFO/hour labor

- NFIFO = Net Farm Income From Operations

### Good Labor Data is Scarce

## 3 Factors of Profitability

Operating Income	
Minus	Operating Expense
Plus or minus	Inventory Changes
<u>Plus or minus</u>	<u>Annual Fixed Cost</u>
Equals	Return to unpaid Family Labor
	Return to unpaid Family Mgt
	Return to unpaid Equity

Or NFIFO

## Performance Measures Include...

- ROROA
- NFIFO (Net Farm Income From Operations)
- NFIFO/Cow
- NFIFO/Acre
- **NFIFO/dollar of revenue**
- NFIFO/Cwt. Equivalent Milk Sold
- NFIFO/Cwt. Milk Sold
- Basic Cost
- Non-basic Cost
- Allocated Cost
- Total Cost

## Most important and most difficult factor to measure is Management !

Management = the ability to do what needs to be done when it needs to be done

- **Financially Successful Managers**
  - Control Operating Costs
  - Control Investment/Debt
  - Generate Income
- Optimize relationship of above 3 factors

## Net Farm Income From Operations (NFIFO) cash and non-cash

- Available to pay family living expenses and new capital investment.
- Cost of housing, income tax, social security, medical, food, clothing, etc.

## Profit Focus of Dairy Systems

- Confinement seek increased income via production
- Graziers seek decreased costs
- Organic seek increased income via price

## Add Income to Total Cost Composition:

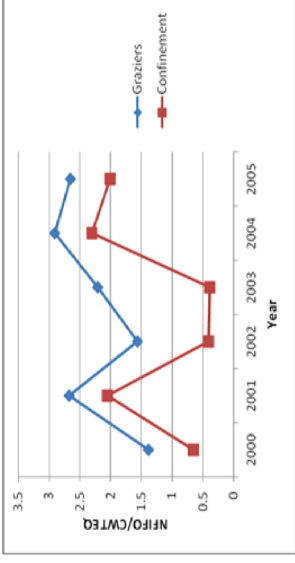
Economic profit when income exceeds total cost

Economic loss when total cost exceeds income  
Income minus allocated costs equals NFIFO

<b>Opportunity Costs:</b> Unpaid labor Unpaid management Unpaid equity
<b>Non-Basic Costs</b> Paid labor Paid management Interest Non-breastock-depreciation
<b>Basic Costs =</b> Total Costs - Non-Basic Costs - Opportunity Cost

Allocated Costs =  
Non-Basic + Basic  
Costs

## New York NFIFO per CWT EQ



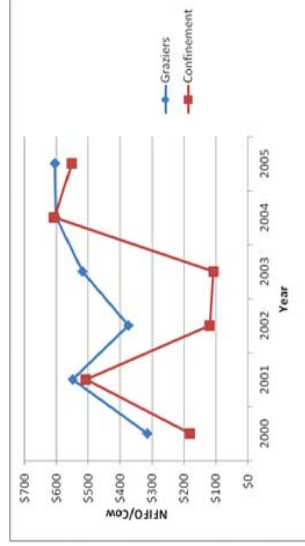
## Total Cost Composition:

<b>Opportunity Costs:</b> Unpaid labor Unpaid management Unpaid equity
<b>Non-Basic Costs</b> Paid labor Paid management Interest Non-breastock-depreciation
<b>Basic Costs =</b> Total Costs - Non-Basic Costs - Opportunity Cost

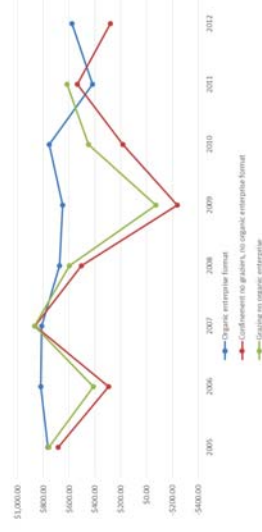
Income minus allocated costs equals NFIFO

Allocated Costs =  
Non-Basic + Basic  
Costs

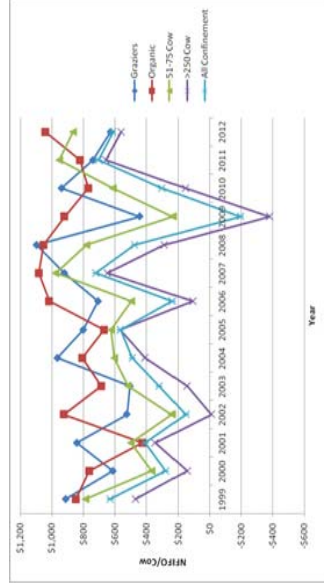
## New York NFIFO per Cow



## NFIFO per Cow of MN confinement, grazing, and organic herds



## NFIFO per Cow: Wisconsin Grazing, Organic and 3 Confinement Sizes



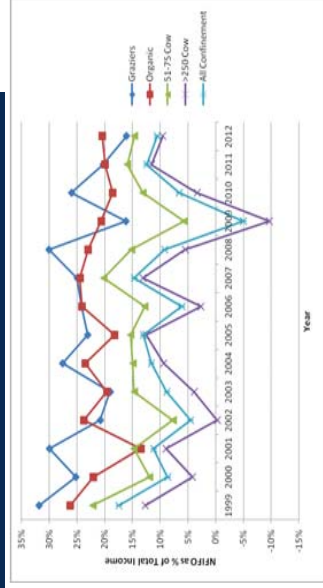
## WI Dairy Farm Systems NFIFO as % of Income Compared, 1999-2012 Average, Cost Basis Omitting Dependent Labor from Expense

System	Range of Average Farm #	Range of Yearly Average Cows per Farm	Multiple Year Average NFIFO's Income	Range of Yearly Average NFIFO's Income
Graziers	11 to 43	61 to 69	24.16%	16.13 to 31.87%
Organic	6 to 17	48 to 82	21.72%	13.53 to 26.26%
Confinement 51-75 Cows	79 to 217	62 to 63	19.22%	8.56 to 27.44%
All Confinement	365 to 721	110 to 192	11.23%	-4.92 to 17.50%
Large Confinement	52 to 79	463 to 624	7.37%	-8.84 to 13.87%

## Fourteen Year (1999-2012) Simple Average WI Cost of Production, Cost Basis Omitting Dependent Labor from Expense

Cost Item	Cost Categories as Per CWT SOLD			
	Grazier	Organic	Confinement 51-75 Cows	All Confinement >250 Cows
Allocated	\$15.17	\$21.87	\$16.84	\$17.12
Non-basic	\$3.74	\$6.34	\$4.36	\$4.81
Basic	\$11.43	\$15.52	\$12.48	\$12.31

## NFIFO as a Percent of Total Income: Wisconsin Grazing, Organic and 3 Confinement Sizes



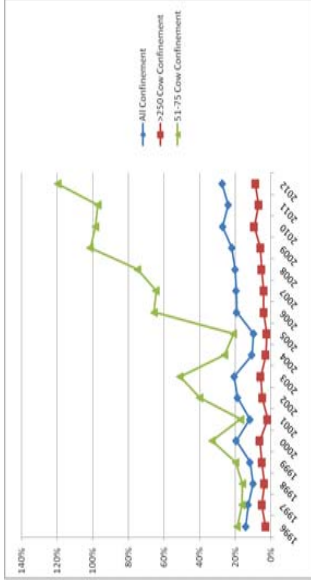
## Fourteen Year (1999-2012) Simple Average WI Cost of Production, Cost Basis Omitting Dependent Labor from Expense

Cost Item	Cost Categories as Percent of Farm Income			
	Grazier	Organic	Confinement 51-75 Cows	All Confinement >250 Cows
Total	98.28%	95.15%	95.77%	97.58%
Allocated	75.84%	78.28%	80.78%	90.73%
Non-basic	18.78%	22.65%	20.92%	24.74%
Basic	57.14%	55.63%	59.86%	64.03%

## Comparing NFIFO +/- Dependent Labor from Expense

Average # of Cows	NFIFO (comparing +/- Dependent Labor)				
	Graziers	Organic	51-75 Cow	Average	>250 Cow
Multiple Year Average (w/o Dependent Labor)	62	65	63	141	537
(+ Dependent Labor)	\$48,257	\$55,812	\$37,575	\$58,488	\$162,392
	\$48,568	\$56,661	\$49,858	\$71,112	\$181,242

## Crop Sales as a Percent of Feed Purchased, WI Small, Average, and Large Confinement



## Multi-State Project Overview

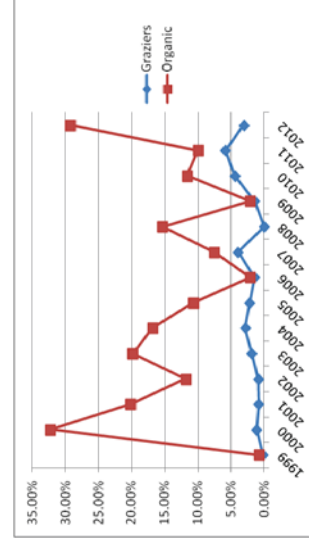
- Consistent state-to-state financial performance difference .
- Graziers economically competitive with confinement herds.
- Top half herds had a large advantage in NFIFO/Cow and in NFIFO/CWT.
- Herds less than 100 cows had a higher NFIFO/Cow and per CWT EQ
- Achieving a specific level of NFIFO/Cow or NFIFO/CWT EQ in a seasonal calving/milking system is more difficult than in a non-seasonal system.
- Graziers with Holsteins were competitive with other breeds

## Comparing The Top Half With The Bottom Half of Graziers Sorted by NFIFO per CWT EQ In 2000 - 2004

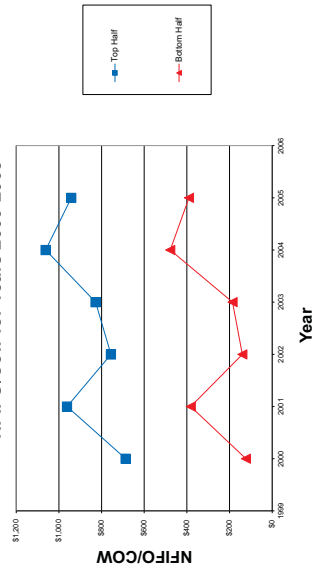
Table 2-4  
Comparing the Top Half with the Bottom Half of Graziers Sorted by NFIFO per CWT EQ  
Six-Month Performance Measures  
2000 - 2004

Measure	Top Half					Bottom Half				
	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
Average Lbs. Milk per Cow	78	80	75	77	89	104	91	97	96	99
NFIFO per Cow (without deducting any labor compensation)	\$7,850	\$5,578	\$5,597	\$5,258	\$4,958	\$6,500	\$5,416	\$5,292	\$4,845	\$6,273
NFIFO per CWT EQ (without deducting any labor compensation)	\$989	\$1,101	\$971	\$1,023	\$1,199	\$566	\$676	\$409	\$410	\$780
NFIFO per Firm	\$3,777	\$5,419	\$3,189	\$4,116	\$5,686	\$1,644	\$3,445	\$1,195	\$2,022	\$3,711
NFIFO per CWT EQ	\$53,276	\$76,462	\$56,609	\$63,470	\$94,036	\$12,790	\$34,307	\$13,990	\$18,249	\$47,537
NFIFO per CWT EQ	\$238	\$416	\$331	\$338	\$522	\$937	\$195	\$107	\$101	\$227

## Crop Sales as a Percent of Feed Purchased, WI Grazing and Organic



## Comparing Top Half with Bottom Half Sorted by NFIFO/Cow for Years 2000-2005



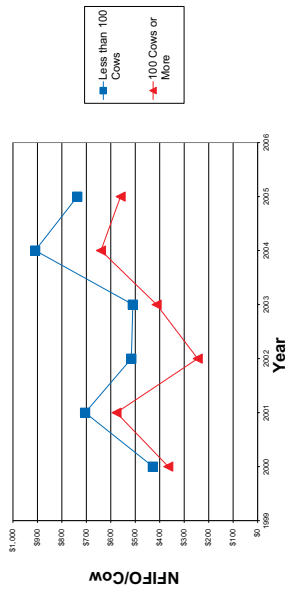
## Top vs Bottom Half

- The top half herds were slightly smaller and sold about the same amount of milk per cow.
- There was a large range of performance
- The rates of difference in NFIFO/Cow and per CWT EQ ranged from about 4 to 1 in low milk price years to 2.5 to 1 in high milk price years.
- The high group didn't get below 687 NFIFO/Cow and 2.98/CWT EQ. The low group didn't get above 478 NFIFO/Cow and 2.27/CWT EQ
- The high group didn't get below 53,876 total NFIFO. The low group didn't get above 47,517 total NFIFO. The low group achieved enough total NFIFO for a family to live on in 3 of 6 years.
- **The top half were a little bit better in a lot of ways.**

## Small vs Large Herds

- The larger herds had about three times as many cows
- Small herd advantage ranged from \$269 to \$63 NFIFO/cow
- Small herd advantage ranged from \$1.07 to \$0.24 NFIFO/CWT EQ
- Much of advantage due to paid labor
- The larger herds had about twice as much NFIFO.

Comparing Herds by Size: NFIFO per Cow



## Comparing Seasonal with Non-Seasonal Calving / Milking Herds

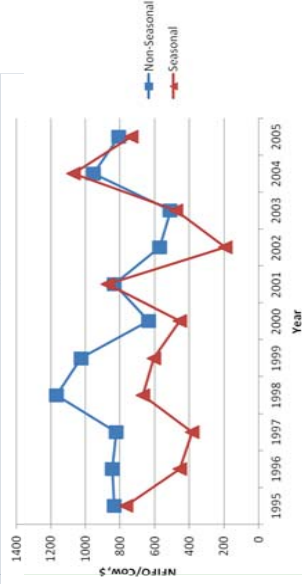
Table 4-1. Seasonal with non-Calving/Milking Herds/Milking Measures from Tables 4-2 to 4-9

Number of Cows per Herd	Seasonal					Non-Seasonal				
	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
Average Lbs. Milk per Cow	11,687	12,270	11,044	11,528	11,727	17,650	15,695	16,454	16,494	16,297
NFIFO per Cow (without deducting any labor compensation)	\$404	\$1,101	\$381	\$609	\$1,038	\$602	\$825	\$683	\$687	\$972
NFIFO per Cow (without deducting any labor)	\$2.20	\$5.46	\$2.36	\$3.40	\$5.72	\$2.64	\$4.21	\$2.86	\$2.99	\$4.60
NFIFO per Farm	\$23,202	\$73,322	\$30,061	\$65,624	\$97,114	\$33,813	\$50,413	\$32,686	\$36,264	\$57,126
NFIFO per Cow	\$100	\$481	\$213	\$402	\$304	\$398	\$397	\$419	\$461	\$738
NFIFO per CWT EQ	\$0.97	\$4.86	\$1.92	\$2.98	\$4.96	\$1.75	\$3.04	\$1.77	\$2.01	\$3.48

## Comparing Herds by Size 2000 - 2004: Less Than 100 vs. 100 Cows or More

Performance Measures Selected from Tables 4-2 to 4-9	Less than 100 Cows					More than or Equal to 100 Cows				
	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
Number of Cows per Herd	59	57	57	57	56	176	173	164	160	190
NFIFO per Cow (without deducting any labor compensation)	\$553	\$689	\$680	\$946	\$1,008	\$601	\$684	\$580	\$689	\$938
NFIFO per CWT EQ (without deducting any labor compensation)	\$2.55	\$4.26	\$2.96	\$2.83	\$4.77	\$2.65	\$4.51	\$2.85	\$3.33	\$4.67
NFIFO per Farm	\$24,256	\$40,057	\$29,456	\$29,335	\$51,195	\$58,150	\$99,877	\$40,095	\$74,215	\$121,520
NFIFO per Cow	\$428	\$705	\$516	\$510	\$899	\$385	\$557	\$245	\$413	\$640
NFIFO per CWT EQ	\$1.89	\$3.49	\$2.23	\$2.23	\$4.22	\$1.45	\$3.01	\$1.16	\$1.99	\$3.19

Wisconsin Seasonal vs. Non-Seasonal Comparison of NFIFO per Cow





## Seasonal vs. Non-seasonal Calving/Milking

- Influenced by state-to-state differences
- Many Prograssimators are Seasonal
- Non-seasonal had better margins 8 of 10 years in Wisconsin
- Best seasonal years (2001 & 2004) had unusual milk price patterns
- Seasonal harder system to manage

Table 6-1 Performance Measures Selected from the Average Performance of Grazing

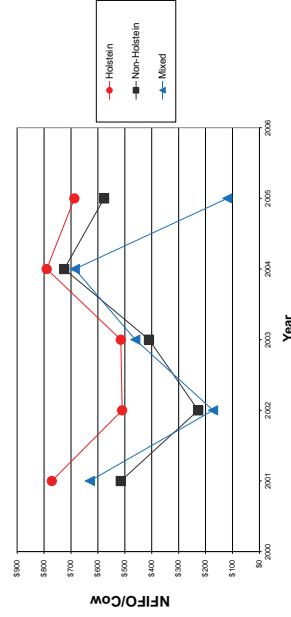
Performance Measures Selected from the Average Performance of Grazing Farms From Many States by Herd Breed: 2004-2001	Holstein				Non-Holstein			
	2001	2002	2003	2004	2001	2002	2003	2004
Average Lbs. Milk per Cow	74*	74*	72	76	97	105	111	116
NFIFO per Cow (without deducting any labor compensation)	\$682	\$792	\$767	\$1,043	\$758	\$428	\$578	\$918
NFIFO per CWT EQ (without deducting any labor compensation)	\$4.69	\$3.18	\$3.24	\$4.61	\$4.05	\$2.25	\$2.90	\$4.88
NFIFO per Farm	\$57,159	\$37,872	\$36,523	\$61,954	\$50,201	\$13,759	\$45,560	\$84,014
NFIFO per Cow	\$771	\$510	\$515	\$790	\$515	\$227	\$410	\$725
NFIFO per CWT EQ	\$3.69	\$2.05	\$2.16	\$3.49	\$2.76	\$1.19	\$2.06	\$3.86

\* By coincidence both herd sizes are equal

## Financial Performance by Breed

- Holstein herds may have more experienced managers
- Breed is only one of hundreds of factors influencing profitability
- Achieving genetic progress slow and expensive
- More variation within breeds than between breeds
- Don't abandon sound cows just because of breed

Performance Measures the Average Performance of Grazing by Herd Breed NFIFO/Cow



## Financial Performance by Breed

- 85% of cows in herd must be recognizable as that breed
- More Holstein than all else
- Performance of most sub groups within non-Holstein have similar performance
- Non-Holstein herds about 40% larger
- Holstein herds sell about 25% more milk per cow
- Holstein herds higher NFIFO/CWT EQ in four of five years

## Additional Results

- Probably competitive at most sizes (Multi-State)
- Grazing more economically flexible
- Graziers using DHI more profitable (Wis)
- Transitional not automatic disadvantage (Wis)
- Major costs similar graziers vs confinement

## Additional Results

- Graziers with more farm management experience are more profitable (Wis)
- Farm management experience appears to be more important for profitability than grazing experience (Wis)

2 of 9

## Dairy Farm Systems Economic Summary

3. Organic price premiums ranged from \$2.70 to \$13.02/CWT vs. graziers and \$3.27 to \$13.02 vs. confinement (lowest margin in 2004, largest in 2009) **Organic needs a price premium of about \$5.00/CWT to offset their higher cost of production.** They averaged \$4.68 from 1999-2005 and \$8.69 from 2006 to 2012 versus graziers.
4. Less experienced organic dairy farms than those sharing financial data may not perform as well.
5. Data scarce from any organic group especially from transitional organic.
6. Organic most competitive when non-organic price low.

4 of 9

## Dairy Farm Systems Economic Summary

10. Organic dairy farms in transition appeared to be competitive with non-organic dairy farms in Quebec study.
11. In 2004, organic dairy farms in a New England study were not as competitive as
  - Non-organic New England dairy farms
  - Any Wisconsin dairy system
12. Since 2005, organic dairy farms in New England data have become more competitive with other dairy systems due to increased price premiums but still higher cost than Wisconsin grazing or organic dairy farm systems.

1 of 9

## Dairy Farm Systems Economic Summary

1. By many measures (especially cwt. sold) **organic was usually the high total and allocated cost producers** usually followed by large confinement, then small confinement with graziers being the lowest cost producers in most measures most years.
2. Still, organic competes with graziers for highest NFIFO by several measures, usually followed by confinement from smallest to largest from 1999-2012.

3 of 9

## Dairy Farm Systems Economic Summary

7. Grazing probably "helps" the organic system more than vice versa.
8. If already practicing organic – go for reward
9. If far from organic practices, 3-5 year transition challenging.

5 of 9

## Dairy Farm Systems Economic Summary

13. Feed costs were much higher for New England farms – especially for those which are organic.
14. Minnesota organic dairy performance fairly similar to Wisconsin from 2005 to 2012.
15. Use Caution comparing one dairy system from one state to other dairy systems in other states

## Dairy Farm Systems Economic Summary

16. There are large consistent differences in NFIFO/\$ revenue between many states and systems.
17. Graziers typically attain more NFIFO/\$ revenue than other dairy systems in their states.
18. Wisconsin dairy systems typically attain more NFIFO/\$ revenue than similar dairy systems in the same state.

## Dairy Farm Systems Economic Summary

22. Large confinement systems rely much more on hired labor than the other three systems. This explains part but not all of the difference in their NFIFO/\$ revenue
23. The ranking of financial performance by state is very different from the official USDA cost of production estimate ranking which relies very heavily on opportunity cost.

## Is MIRG Economically Competitive?

Presented by: Tom Kriegl  
Farm Financial Analyst Emeritus  
**University of Wisconsin Extension and  
Center for Dairy Profitability**  
**Website: [cdp.wisc.edu](http://cdp.wisc.edu)**

NRCS/UWEX  
Green Bay, WI  
December 5th, 2013



## Dairy Farm Systems Economic Summary

19. Small dairy systems typically attain more NFIFO/\$ revenue than large dairy systems in the same state.
20. The largest farms tend to generate more dollars of total NFIFO per farm and per owner compared to the smallest farms.
21. This economic dairy data indicates that the economies of scale (lowest cost of production per unit) occur at a much smaller size than people expect (somewhere less than 100 cows per farm).

## Dairy Farm Systems Economic Summary

24. Family size farms (the size that can be operated mainly by family labor) are fairly similar across states in terms of the total NFIFO they generate. However, the size of family size farms can be quite different from state-to-state.
25. Organic, graziers, and large confinement more satisfied than small confinement and non intensive graziers.  
<http://www.cias.wisc.edu/wp-content/uploads/2008/07/qo0707final.pdf>