

ECONOMICS OF PASTURE-BASED DAIRY FARMING

G.A. BENSON

DEPT. OF AGRICULTURAL & RESOURCE ECONOMICS
NORTH CAROLINA STATE UNIVERSITY

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Questions to be addressed

- Are pasture-based dairy farms more profitable than confinement farms?
- What breeds or crosses are most profitable on pasture based farms?
- Are seasonal or year-round calving systems more profitable on pasture based dairy farms?
- What level of grain feeding is optimal for pasture-based?
- Are organic certified dairy farms more profitable than non-organic pasture-based dairy farms?

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Methodological Issues

- Components of Pasture-Based Dairy Farms:
 - Pasture availability, including acreage, pasture type and yield
 - Pasture use: There is a continuum from 100% confinement to 100% pasture diet
 - Pasture management: This varies from set stocking to intensively managed rotational grazing where milking animals are moved as often as twice-daily to new grazing

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Methodological Issues, cont.

- Pasture-based dairy farms may incorporate other components such as seasonal milk production. i.e.,
 - Milking herd is completely dry for a few weeks each year
 - 12-month calving interval
 - Calving window seeks to match milking cows nutritional needs to pasture growth or mitigate climate variables
- Most economic studies lack detailed data on farm resources and production practices, which is an obstacle to identifying the profitability of a specific component or practice
- The definitions and methodology used in collecting, summarizing and reporting financial data are not standardized

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Methodological Issues

- Types of Economic Information
 - Individual farm data
 - Data from multiple farms of a similar type, with comparisons among farm types
 - Research on farm systems or components
 - Budgets or simulations
- Examples of each will be presented

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1. Individual Farm Data

- Case studies are popular in the farm press but...
 - University-run farm business records program data show a huge variation in financial performance
 - This means you cannot make judgments about the performance of a particular practice or farming system based on the financial data from one farm without additional benchmarks
 - This applies to both confinement and pasture-based dairies

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Great Lakes Grazing Network, 2003

| Item | High Profit | Low Profit | Average |
|--|-------------|------------|---------|
| Number of farms | 50 | 50 | 102 |
| Average no. of cows in herd | 77 | 98 | 87 |
| Milk sold per cow, lb. | 15,938 | 14,845 | 15,381 |
| Cost of production, \$/cwt | \$9.11 | \$11.59 | \$10.39 |
| Net Farm Income From Operations, \$/cwt EQ | \$3.39 | \$0.91 | \$2.11 |
| Net Farm Income From Operations, \$/cow EQ | \$828 | \$186 | \$461 |

Source: Tom Kreigl, UW Center for Dairy Profitability

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New York Dairies, 2004

| Item | Bottom 10% | Average | Top 10% |
|--|------------|----------|-----------|
| Total Cost, \$/cwt | \$24.72 | \$15.74 | \$13.68 |
| Net Farm Income, \$/cow | -\$70 | \$601 | \$1,306 |
| Return on Assets | -5% | 11.3% | 23% |
| Labor & Management Income per Operator, \$ | -\$63,025 | \$78,061 | \$357,551 |

Items in each column are ranked independently

Source: 2004 Dairy Farm Business Summary, Cornell University

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2. Farm Summary Data

- There are many years of piecemeal data on pasture-based v. confinement systems
- Literature survey, Penn State, 1996
 - Summary of 22 reports from the Northeast & Upper Midwest
 - Some farms used supplementary grazing
 - Advantage in Net Farm Income measures of \$49-\$294/cow to dairy farms that grazed
- University of Missouri literature survey, 2002
 - Results were similar to the PSU report

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Competitiveness: New York Dairies

| Item | 2003 | | 2004 | |
|--|--------|--------|--------|--------|
| | Grazed | Conf. | Grazed | Conf. |
| Number of farms | 27 | 76 | 30 | 84 |
| Average no. of cows | 98 | 99 | 104 | 103 |
| Milk sold/cow, lb. | 15,728 | 19,741 | 17,144 | 19,202 |
| Net Farm Income/Cow | \$449 | \$193 | \$652 | \$571 |
| Return on Assets, % | 4.7% | 0.2% | 8.1% | 5.7% |
| Labor & Management Income/Operator/Cow | \$162 | \$79 | \$215 | \$103 |

Source: Dairy Farm Business Summary, Cornell University

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Competitiveness: New York Dairies, 2004

| Item | Higher Profit | | Average | |
|--|---------------|---------|---------|--------|
| | Grazed | Conf. | Grazed | Conf. |
| Number of farms | 10 | 11 | 30 | 84 |
| Average no. of Cows | 110 | 114 | 104 | 103 |
| Milk sold per cow, lb. | 17,186 | 21,434 | 17,144 | 19,202 |
| Net Farm Income/Cow | \$957 | \$1,152 | \$652 | \$571 |
| Return on Assets, % | 13.2% | 13.4% | 8.1% | 5.7% |
| Labor & Management Income/Operator/Cow | \$520 | \$503 | \$215 | \$103 |

Source: 2004 Dairy Farm Business Summary, Cornell University

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Breed Effects, GLGN, Average, 2001-3

| Item | Holstein | Non-Holstein |
|--|----------|--------------|
| Milk Price, net, \$/cwt. | \$14.61 | \$15.06 |
| Operating cost, \$/cwt | \$10.56 | \$11.19 |
| Net Farm Income from Operations, \$/cwt EQ | \$2.63 | \$2.00 |
| Net Farm Income from Operations, \$/cow EQ | \$599 | \$384 |

Source: Tom Kreigl, UW Center for Dairy Profitability

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Breed Effects

- Vermont Dairy “PMOP”
 - Compared same size Jersey and Holstein grazing herds
 - Holsteins outperformed Jerseys on a per cow basis
- There are no comparable financial data on crossbred cows or minor breeds
- Note that there is a lack of detail on production systems and whole farm profitability is a key issue not addressed

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Seasonal Calving, GLGN, 2000-3

| Item | Seasonal | Non-Seasonal |
|--|----------|--------------|
| Milk Price, net, \$/cwt | \$14.68 | \$14.36 |
| Operating cost, \$/cwt | \$10.62 | \$10.84 |
| Net Farm Income from Operations, \$/cwt EQ | \$2.36 | \$2.14 |
| Net Farm Income from Operations, \$/cow EQ | \$424 | \$468 |

Source: Tom Keigl, UW Center for Dairy Profitability

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3. Research

- Mississippi State University
 - Compared milking cows on grazing v. no-till silage-based feeding
 - Silage fed herd produced more milk but had higher feed costs
 - Income over feed cost was the same for both groups

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Research

- NC State University
 - Split the NCSU dairy herd into four treatment groups
 - Compared, over seven lactations:
 - ❖ Grazing cows and cows in confinement
 - ❖ Seasonal calving, fall & spring
 - ❖ Each treatment group had both Holsteins and Jerseys

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- Grazing cows of either breed:
 - Produced less milk but had lower feed costs
 - Income over feed cost was not significantly different for season or feeding system
- Holsteins had higher income over feed costs per cow than Jerseys
- Reproductive efficiency and herd health favored:
 - Jerseys over Holsteins
 - Grazing cows over cows in confinement
- Non-feed costs were not measured but were likely to be significantly lower for grazing herds

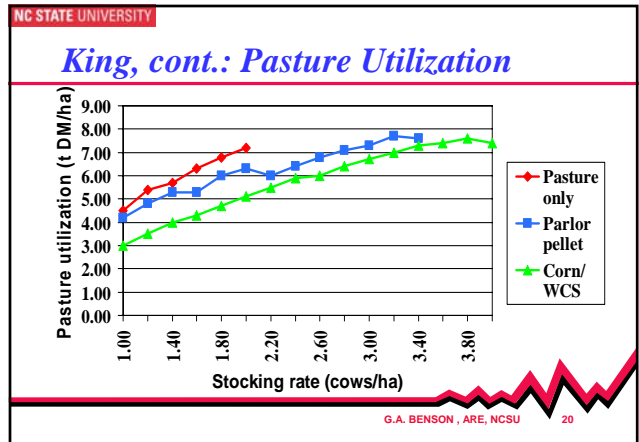
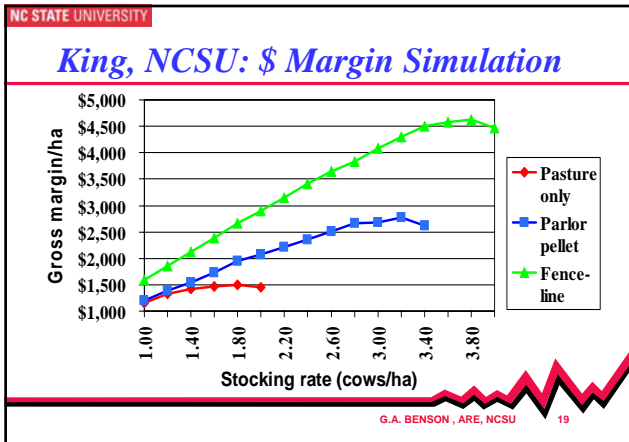
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4. Simulation

- King, NCSU
 - Computer simulation of different stocking rates and grain feeding levels and systems
 - Calibrated to the pasture and herd performance data from the NCSU grazing project
 - Used representative regional milk and input prices

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King, cont.

Conclusions:

- For the highest profit levels for pasture based dairy farms under North Carolina economic conditions:
 - High levels of grain
 - High stocking rate
 - High levels of pasture utilization
- Questions raised included:
 - The practical implementation of these principles
 - The environmental consequences associated with high stocking rates

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Research

- An ongoing NCSU field trial at the Center for Environmental Farming Systems is evaluating:
 - Two stocking rates & feeding strategies
 - Purebred & crossbred cows
 - Seasonal calving
 - Environmental impact

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Preliminary Results, CEFS Project

| Item | Low Rate 2004-5 | High Rate 2004-5 | Low Rate 2005-6 | High Rate 2005-6 |
|--------------------------|-----------------|------------------|-----------------|------------------|
| Stocking Rate, cows/acre | 0.93 | 1.42 | 0.81 | 1.21 |
| Milk Sales, \$/cow/day | \$6.90 | \$6.84 | \$5.76 | \$6.17 |
| Feed cost, \$/cow/day | \$1.80 | \$2.11 | \$1.64 | \$1.96 |
| IOFC, \$/cow/day | \$5.10 | \$4.74 | \$4.12 | \$4.22 |
| IOFC, \$/acre | \$4.74 | \$6.72 | \$3.34 | \$5.10 |

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Organic Production

- Tom Kreigl, University of Wisconsin, compared data from a few organic farms with non-organic farms over 2000-2004:
 - Organic farms had a net farm income per cwt. advantage over non-organic farms in one year
 - Non-organic farms had an advantage two years
 - Both farm types were tied one year
 - Not all organic farms practiced MIRG

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Organic v. Conventional, VT, 1999

| Item | Conventional | Organic |
|-----------------------|--------------|---------|
| Number of Farms | 182 | 7 |
| Average no. of Cows | 65 | 46 |
| Milk sales income/cow | \$2,812 | \$3,030 |
| Total income/cow | \$3,193 | \$3,198 |
| Feed expense/cow | \$661 | \$966 |
| Total expense/cow | \$2,636 | \$2,414 |
| Net Farm Income/cow | \$556 | \$834 |

Source: Lisa McCrory, Northeast Organic Farming Association of VT

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Organic v. Conventional, CA, 1999

| Item | Conventional | Organic |
|-----------------------------|--------------|----------------------|
| Number of Farms | 27 | 6 |
| Milk price, net, \$/cwt | \$13.17 | \$16.53 |
| Expenses, \$/cwt | \$11.07 | \$14.75 ^a |
| Net Farm Income, \$/cwt | \$2.10 | \$1.77 |
| Milk sales income/cow/month | \$226 | \$252 |
| Total expense/cow/month | \$190 | \$225 ^a |
| Net Farm Income/cow/month | \$36 | \$27 |

^a Organic expenses include amortized transition costs
Source: L.J. Butler, University of California-Davis

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Organic Dairying

- Dalton, et al. at the Universities of Maine and Vermont are monitoring costs and returns on organic farms in ME and VT
- They concluded that organic farms:
 - Were not profitable in 2004 based on returns to labor and management or rates of return on assets
 - Conventional farms had a higher rate of return on assets. However, note that conventional milk prices were high in 2004, which may give a relative advantage to conventional farms

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Summary and Conclusions

- Dairy farm financial performance measures reported in these studies show:
 - Average profitability is low for all types of farms but some farms of all types were profitable
 - Pasture-based farms were somewhat more profitable, on average
 - There is little information on the profitability of specific practices, such as rotational grazing, seasonal production
 - Data on organic dairying are limited and the financial results are mixed

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Summary & Conclusions

- Dairy farm financial performance, cont.
 - Available financial evidence fails to support anecdotal suggestions on breed, seasonal production, etc. for pasture based systems
 - The profitability of any farm type or practices likely depends on many factors, including specific characteristics of each farm and each operator
 - More comprehensive data are needed, including farm resource, farm production and financial data

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Summary & Conclusions

- Farmers interested in converting to pasture-based dairying, including seasonal production and organic options are advised to:
 - Examine their family goals
 - Evaluate farm resources and financial status
 - Develop a detailed farm plan
 - Evaluate profitability and cash flow
- All dairy farmers are likely to benefit from adopting recommended business management practices!

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