

### Introduction

Wisconsin is the largest cheese producer, is the second largest milk producer, and has the largest dairy farm community in the U.S. Dairy farming in Wisconsin is the number one agricultural activity and a major economic engine that has a total economic impact of milk production of \$6.4 billion in industry sales, more than 80,400 jobs, and \$1.8 billion in total income (Deller, 2007). The dairy industry in Wisconsin greatly sustains rural communities. However, this traditional and strong industry is struggling to remain economically viable because skyrocketing corn grain and other concentrated supplement feed prices together with uncertain milk price fluctuations. Dairy farmers and Extension personnel have indicated the urgent need to improve dairy cattle feed cost-efficiency for the dairy industry to remain economically and environmentally sustainable.

### Hypothesis

Effective feeding strategies that include corn grain substitution by forage and grazing will improve economic net return in many farm and market situations in Wisconsin. These substitutions will additionally decrease dairy farm environmental impacts and promote more ecologically sustainable production systems.

### Materials and Methods

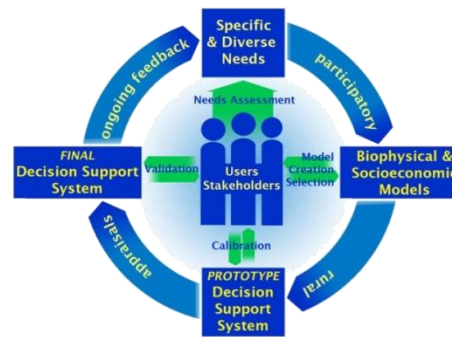
Integration of four major components into a bio-economic decision support system, the *corn-replacer*:

- 1) Development of a Markov-chain, stochastic, dynamic herd simulation model to portray real-life dairy cattle conditions, (Cabrera et al., 2006; 2008b);
- 2) Compilation and analyses of data from extensive field research of corn/forage substitution, Tessmann et al. (1991);
- 3) Development of corn/forage substitution production models, Earleywine (2001); and
- 4) Integration of grazing concentrate supplementation, Soder and Rotz (2001); Bargo et al., (2003).

### Acknowledgements

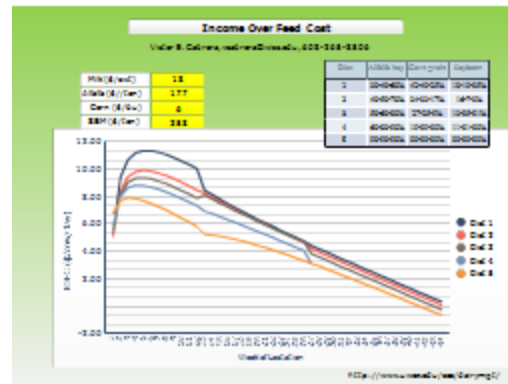
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### Approach



Participatory modeling framework. Source: Cabrera et al. (2008a)

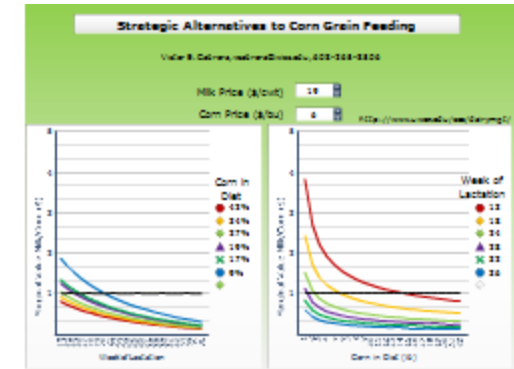
### Preliminary Results



### Implications

- 1) Large opportunities exist in Wisconsin to improve income over feed costs by increasing the use of forages and/or grazing practices in lactating dairy cattle diets
- 2) These opportunities are higher in mid and late lactation when the marginal response of milk to corn grain decreases sharply
- 3) Further study is required to incorporate (i) milk fat and protein, (ii) grazing and other forages, (iii) herd groups and parity, and (iv) health concerns

### Preliminary Results



<http://www.uwex.edu/ces/dairymgt/feeding.cfm>

### References

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 Soder, K. J., and C. A. Rotz. 2001. Economic and environmental impact of four levels of concentrate supplementation in grazing dairy herds. *Journal of Dairy Science* 84:2560-2572.  
 Tessmann, N. J., H. D. Radloff, J. Kleinmans, T. R. Dhiman, and L. D. Satter. 1991. Milk production response to dietary forage:grain ratio. *Journal of Dairy Science* 74:2696-2707.

### Other Research/Programming Endeavors

- Livestock Gross Margin for Dairy (LGM-Dairy) Insurance
- Stochastic dairy modeling to forecast economic outcomes
- Economic impact of herd diseases in Wisconsin dairy farms
- Energy and environmental impacts of Wisconsin dairy farms
- Early post calving mastitis test and treatment decision making
- Long-term economic and ecologic dairy farm sustainability in the U.S.