

Transforming Forages to Improve Nitrogen Use by Dairy Cows and Decrease Nitrogen Emissions

**FASS Environment, Waste Management and
Ecosystems Symposium**

ADSA-ASAS 2006 Joint Annual Meeting

July 13, 2006

Minneapolis, MN

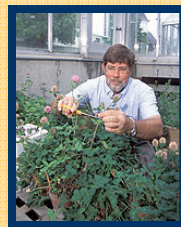


Sponsored by . . .

U.S. Dairy Forage Research Center USDA-Agricultural Research Service



Madison, WI



Prairie du Sac, WI



Transforming Forages to Improve Nitrogen Use by Dairy Cows and Decrease Nitrogen Emissions



Now being formed . . .

Institute for Environmentally Integrated Dairy Management



Marshfield, WI

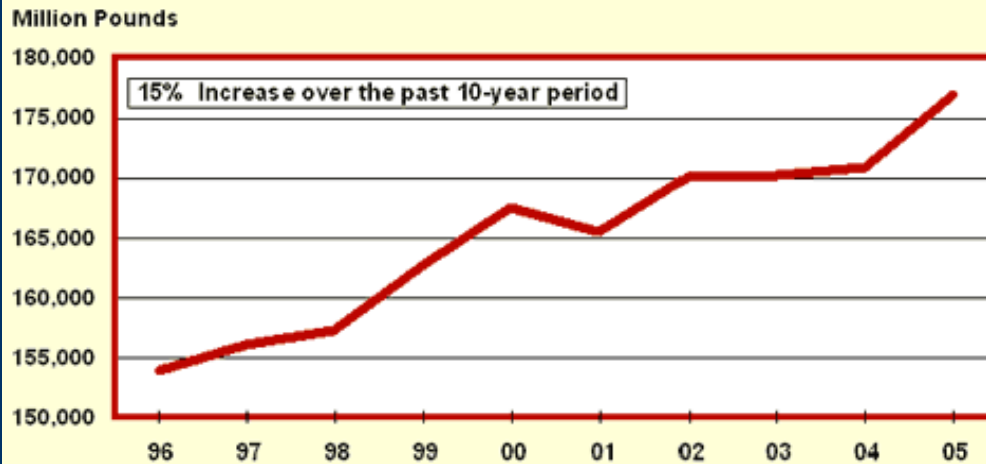


Transforming Forages to Improve Nitrogen Use by Dairy Cows and Decrease Nitrogen Emissions



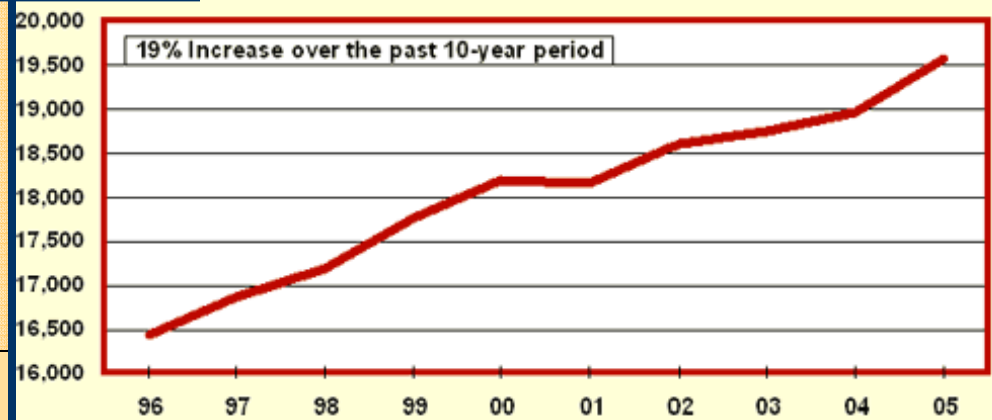
Changing Dairy Production

Milk Production, 1996-2005
United States



USDA-NASS
2-17-2006

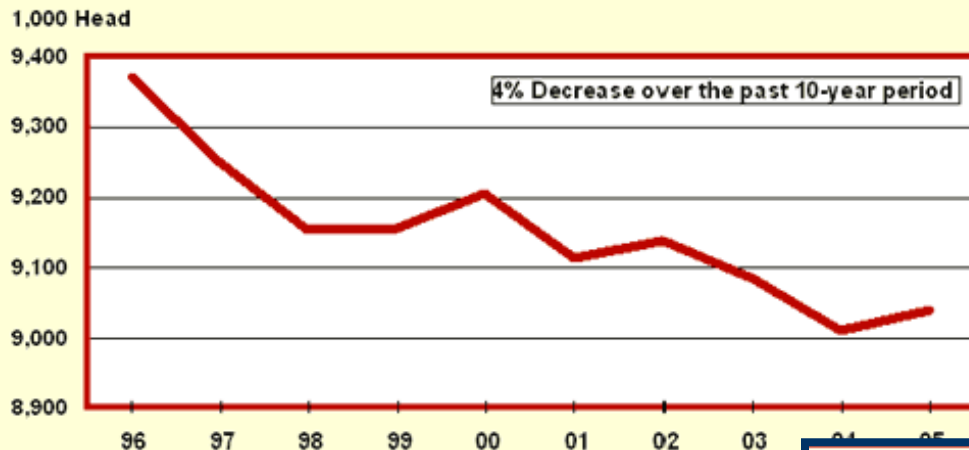
Milk per Cow, 1996-2005
United States



USDA-NASS
2-17-2006

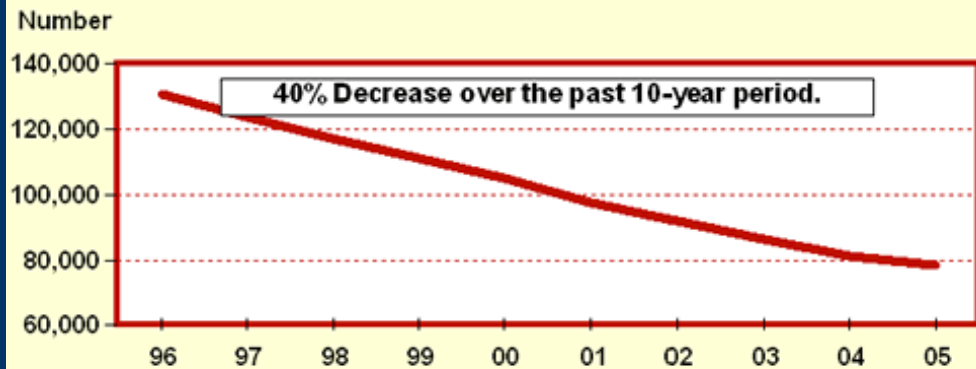
Changing Dairy Production

Milk Cows, 1996-2005
United States



USDA-NASS
2-17-2006

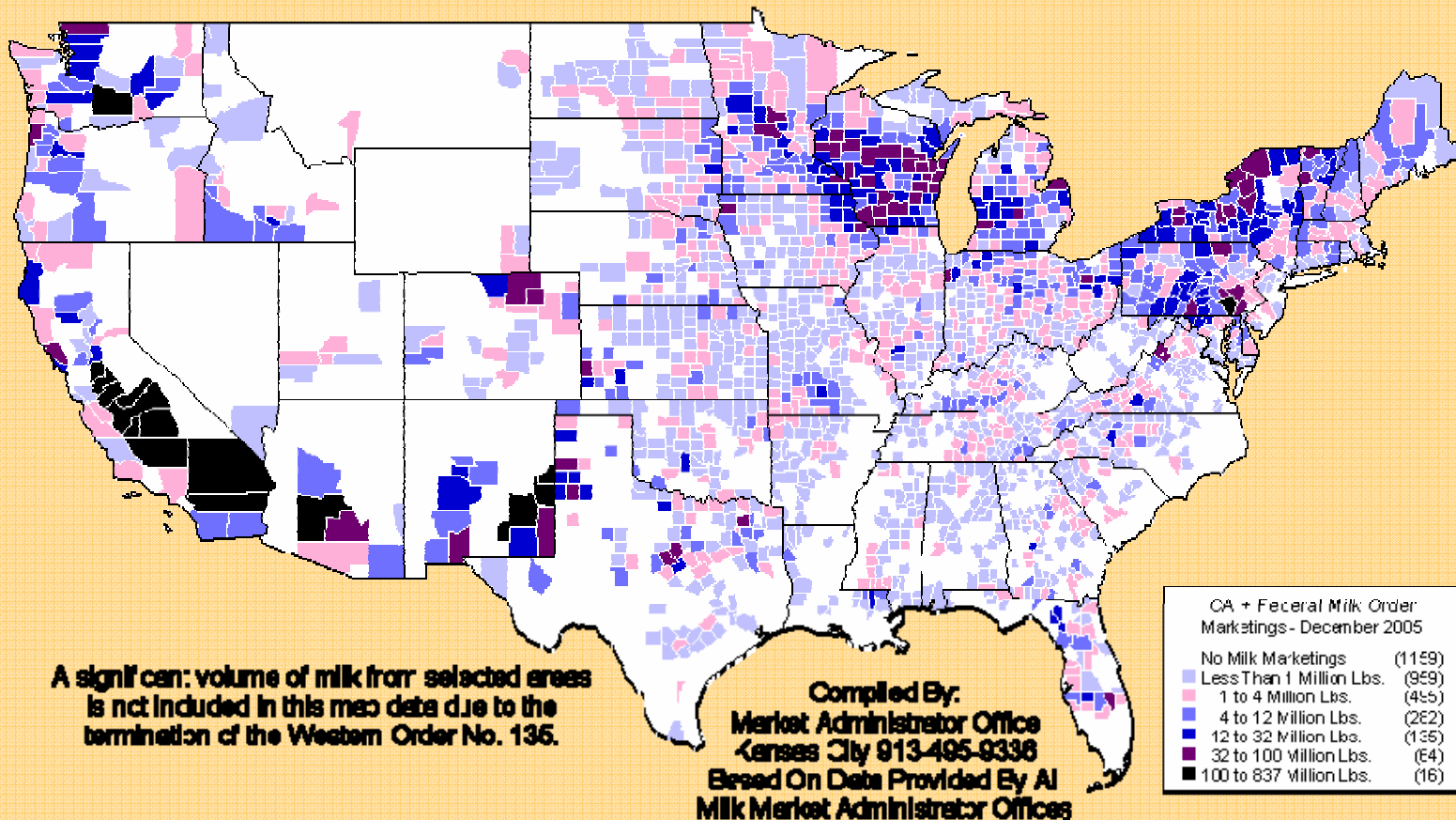
Milk Cow Operations, 1996-2005
United States



USDA-NASS
1-31-2006

Changing Dairy Production

CA + Federal Order Milk Marketings By County - December 2005



Transforming Forages to Improve Nitrogen Use by Dairy Cows and Decrease Nitrogen Emissions



Dairy Farms Increasing in Size

- Expanded herds often purchase more forage and feeds
- Result: Amount of forage in diet is declining
 - Increased risk to animal health

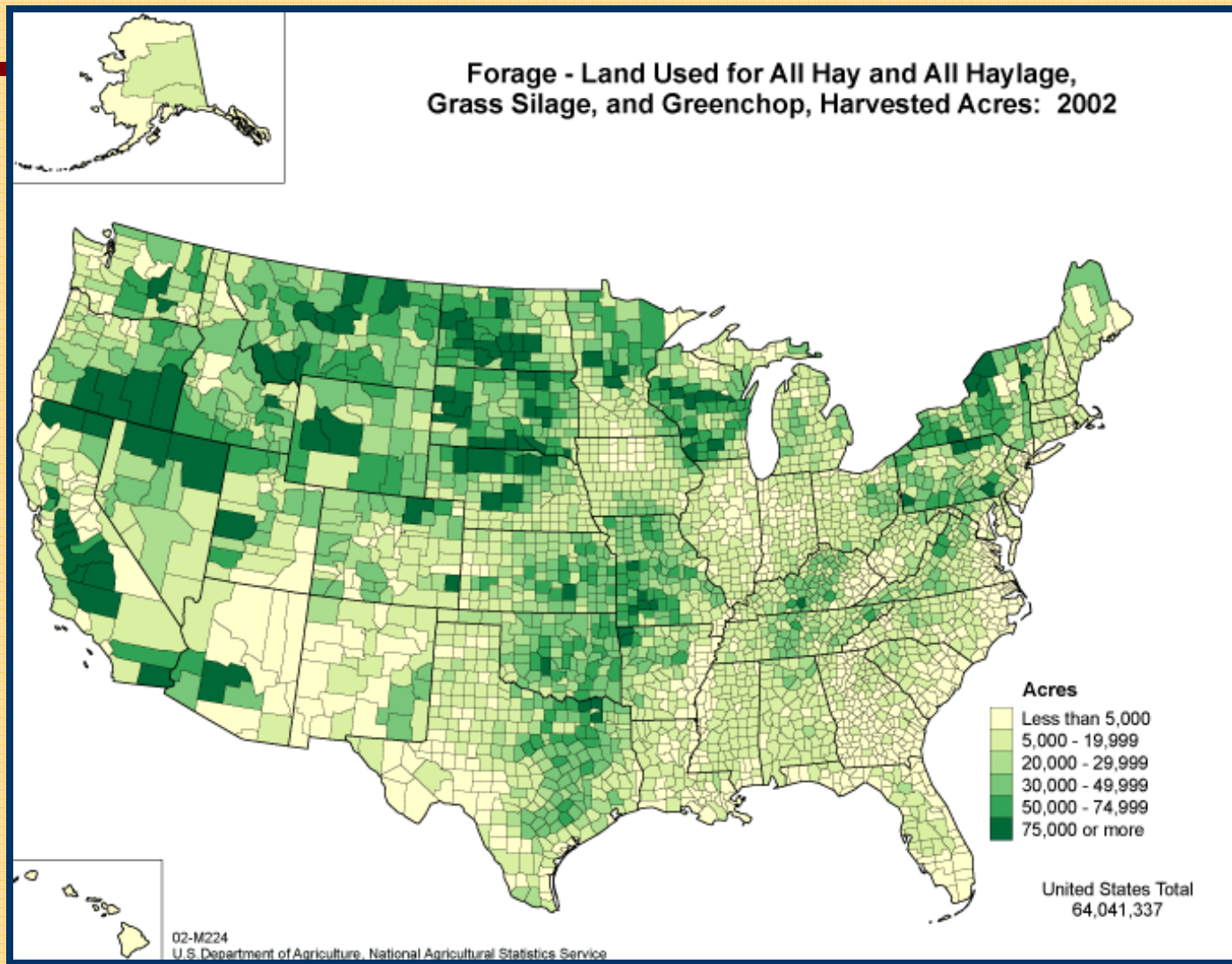


Dwindling Profit Margins

- **More short-term economic decisions are being made in ration formulation**
- **Result: Amount of forage in diet declining**
 - **Reduced perennial forage crops in rotation**



Forage Crop Production



Transforming Forages to Improve Nitrogen Use by Dairy Cows and Decrease Nitrogen Emissions



We don't want to see reduced perennial forage crops in rotation because . . .

- **Perennial forage crops are good for environment**
- **Good for cow health**



However . . .

- **high-quality forage reduces N use efficiency . . .**
- **leading to higher manurial N loading back to fields . . .**
- **creating an increased risk of N leaving farm via runoff, leaching, or ammonia emissions.**



Can we . . .

. . . transform forages to improve nitrogen use by dairy cows and decrease nitrogen emissions to the environment?

That's the challenge we presented to our Symposium speakers.



This symposium will...

- **View management of N from a whole-farm perspective**
- **Consider importance of forages beyond their use as dairy feed (soil, water, air, new products)**



This symposium will...

- Look at the effect of crop preservation (harvest and storage) on N
- Discuss the animal utilization of forages and what happens to N in the cow



This symposium will...

- **Track nitrogen uptake & transformations in soil & air**
- **Look at ideas for transforming plants to increase N use in the animal and decrease N emissions**



This symposium will...

- **Utilize multidisciplinary approach**
 - **Engineer, soil scientist, agroecologist, agronomists, plant physiologist, plant breeder, microbiologist, molecular geneticist, dairy scientists**
 - **Representing dairy regions**
 - **International expertise**



We hope you will gain . . .

- **N utilization on dairy operations is complex (profit vs environment)**
- **Perennial forages benefit farming beyond the value of the feed**
- **Buffering capacity of perennial legumes for soil N**
- **Preservation management and plant transformation have the potential to reduce proteolysis in hay and silage**



We hope you will gain . . .

- **Feeding high forage diets presents environmental challenges**
- **Role of inorganic vs organic manure N in crop uptake**
- **Fate of N transformations from manure**
- **Transformation of plants will aid production and environment**

