

# The Changing Nature of Dairy Rations and How it Affects Forage Demand

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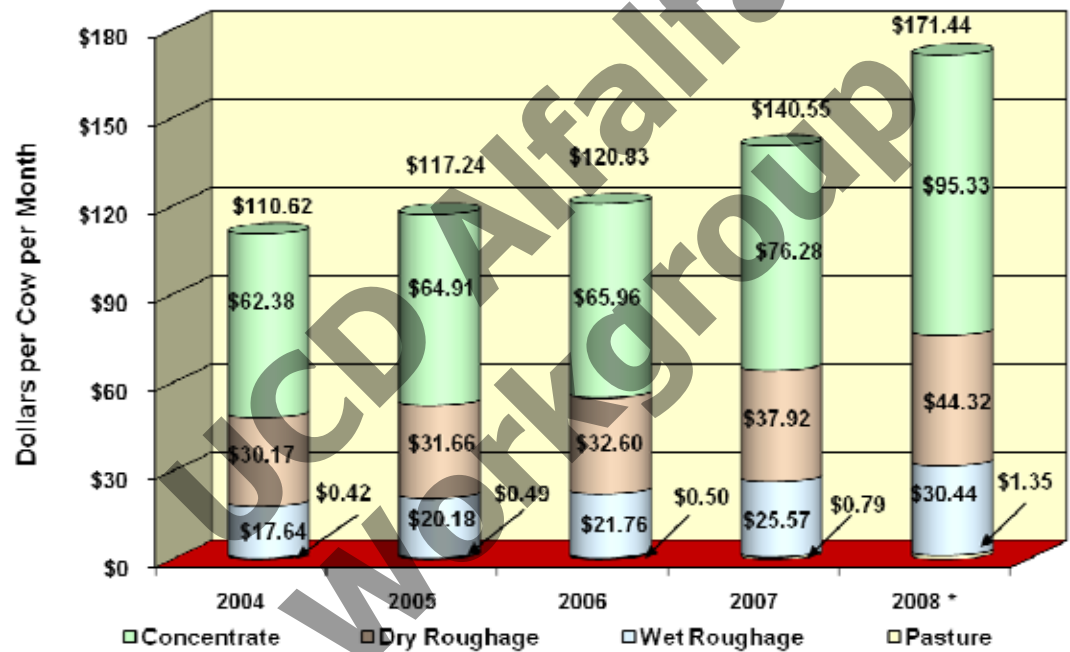
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Western Milling, Goshen, CA

**If you don't like something change it; if you can't change it, change the way you think about it.**

Mary Engelbreit

UCD Alfa  
Workgroup

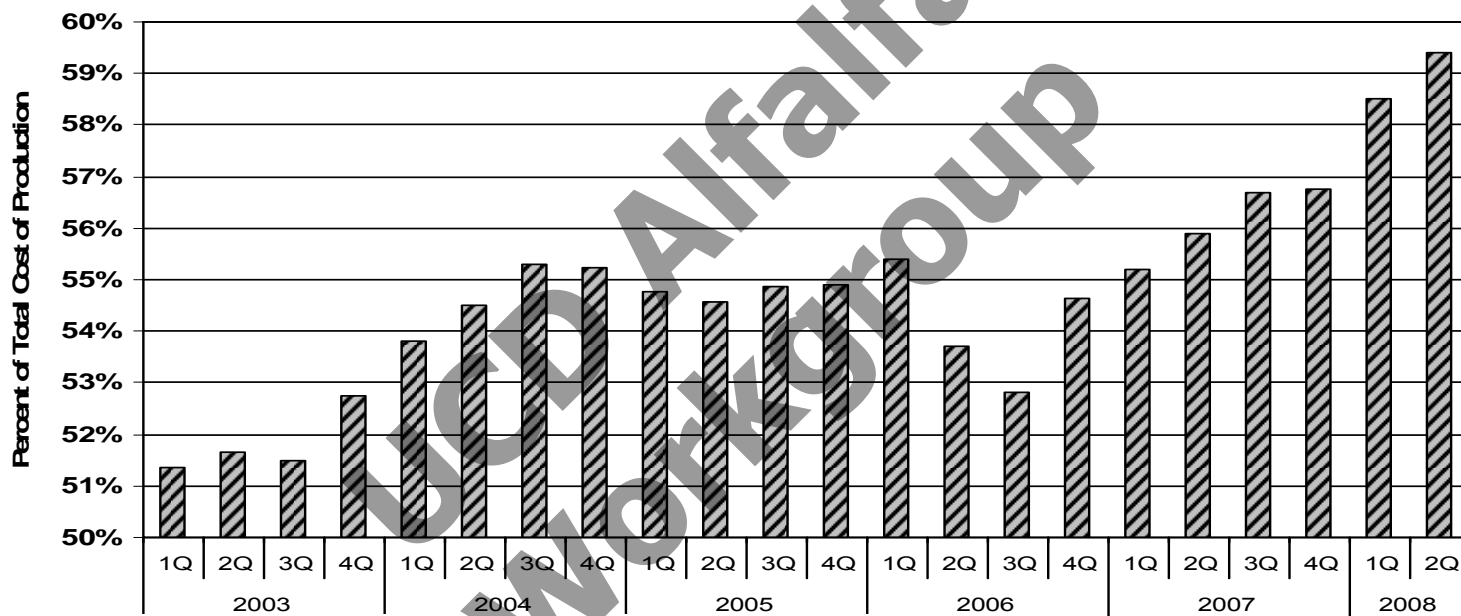
Total Feed Cost Per Cow, Per Month <sup>1/</sup>  
California, 2004 - 2008



<sup>1/</sup> Includes Feed costs for both milk cows and dry cows

\* For The Six Months Ended June 30, 2008

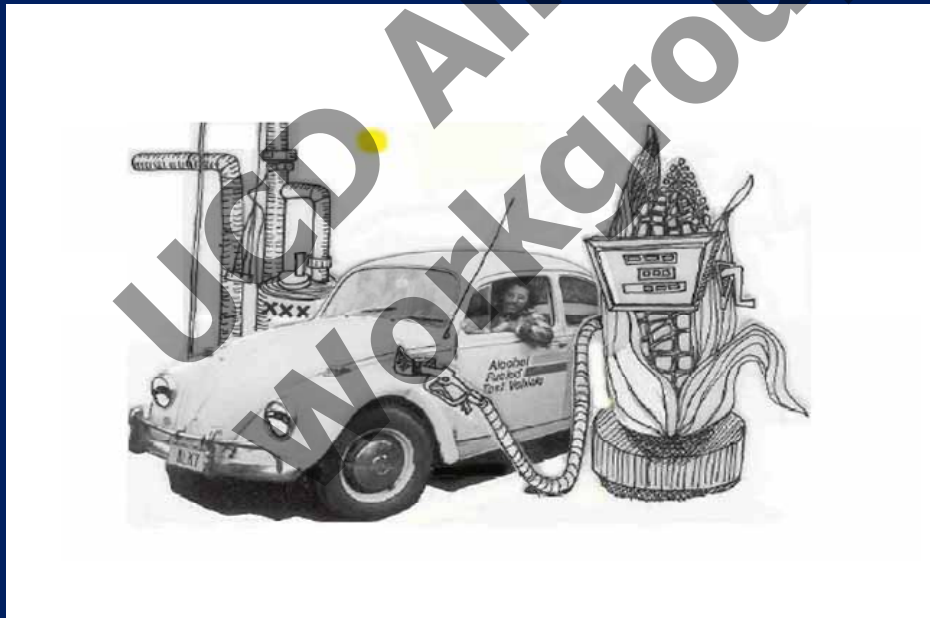
**Total Feed Costs (Percent of total Cost of Production)**  
 January 2003 through June 2008



■ Total Feed Costs (Percent of Total Cost of Production) Source: CDFA Dairy Marketing Branch

What have been the reasons for the high feed costs?

1. Ethanol production



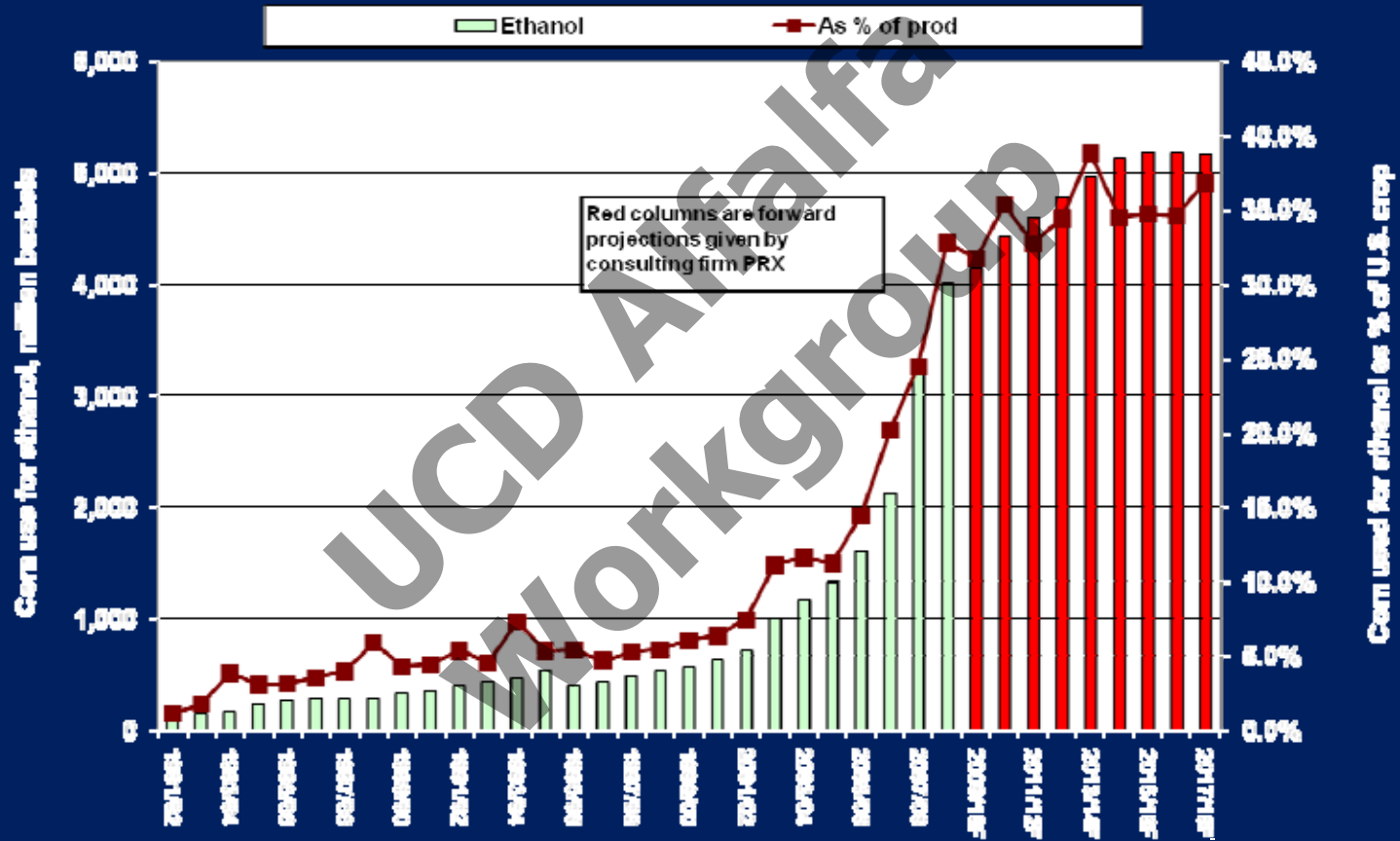
## Ethanol background

- ❑ The passage of The Clean Air Act of 1990 required use of oxygenated fuel for reformulated gasoline for utilization in areas where ozone problems exist.
- ❑ The Energy Policy Act of 2005 established a renewable fuels standard (RFS) that mandated the use of ethanol and other renewable fuels in gasoline. The RFS requires use of 11.5 billion gallons of ethanol by year 2012.
- ❑ The latest development was the 2007 State of the Union address which highlighted the need to reduce gasoline consumption by 20% over the next 10 years and to increase renewable and alternative fuels by up to 35 billion gallons which is at least five times the present mandate by the year 2017.

## Ethanol Issues

- ❑ Ethanol has come under heavy criticism for a number of reasons.
  1. Foremost has been the huge escalation in food costs being blamed on high corn prices due to greater ethanol output.
  2. The livestock, dairy, and poultry industries have been in an uproar over the rise in what is their largest expenditure.
  3. In this election season, there has been increased scrutiny over Federal and state subsidy payments to the ethanol industry along with the onerous import tariff that prevents cheaper foreign product from coming into the U.S.
  4. Finally, talk of shifting feedstock from corn to other sources being blunted by reports that commercially feasible cellulosic ethanol production is still years away.

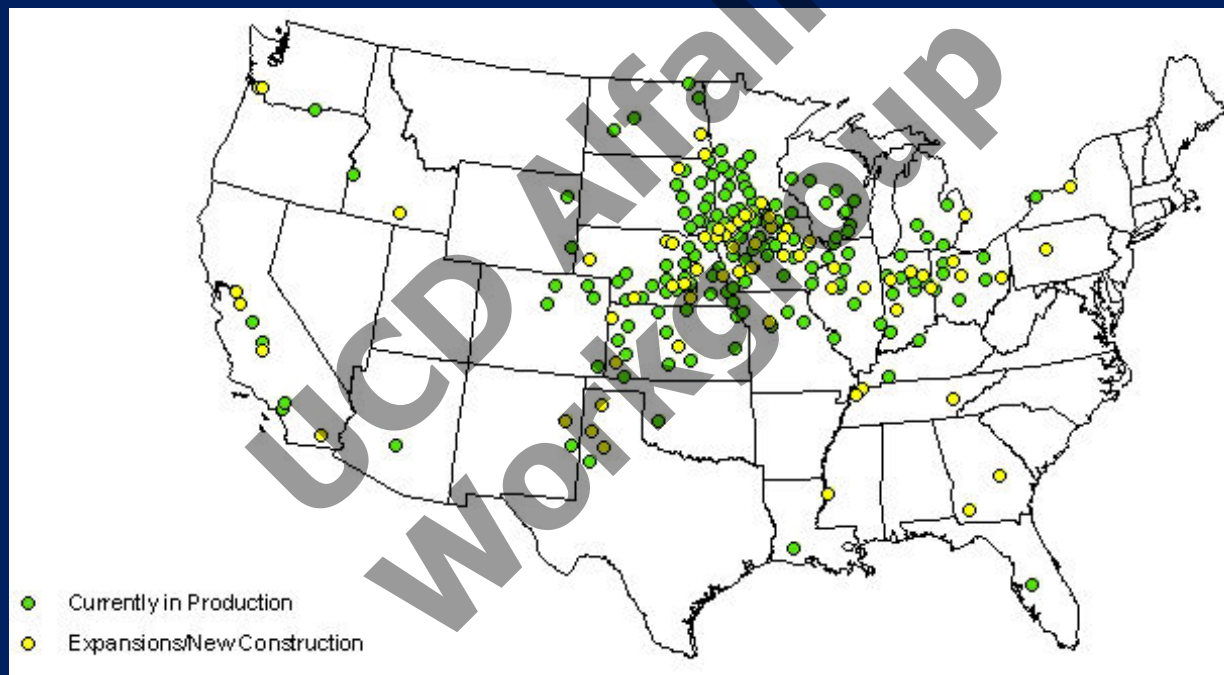
## U.S. corn used in production of ethanol in million bushels and as % of production



Let's all get on the bandwagon!



# Ethanol plants currently in use or under construction

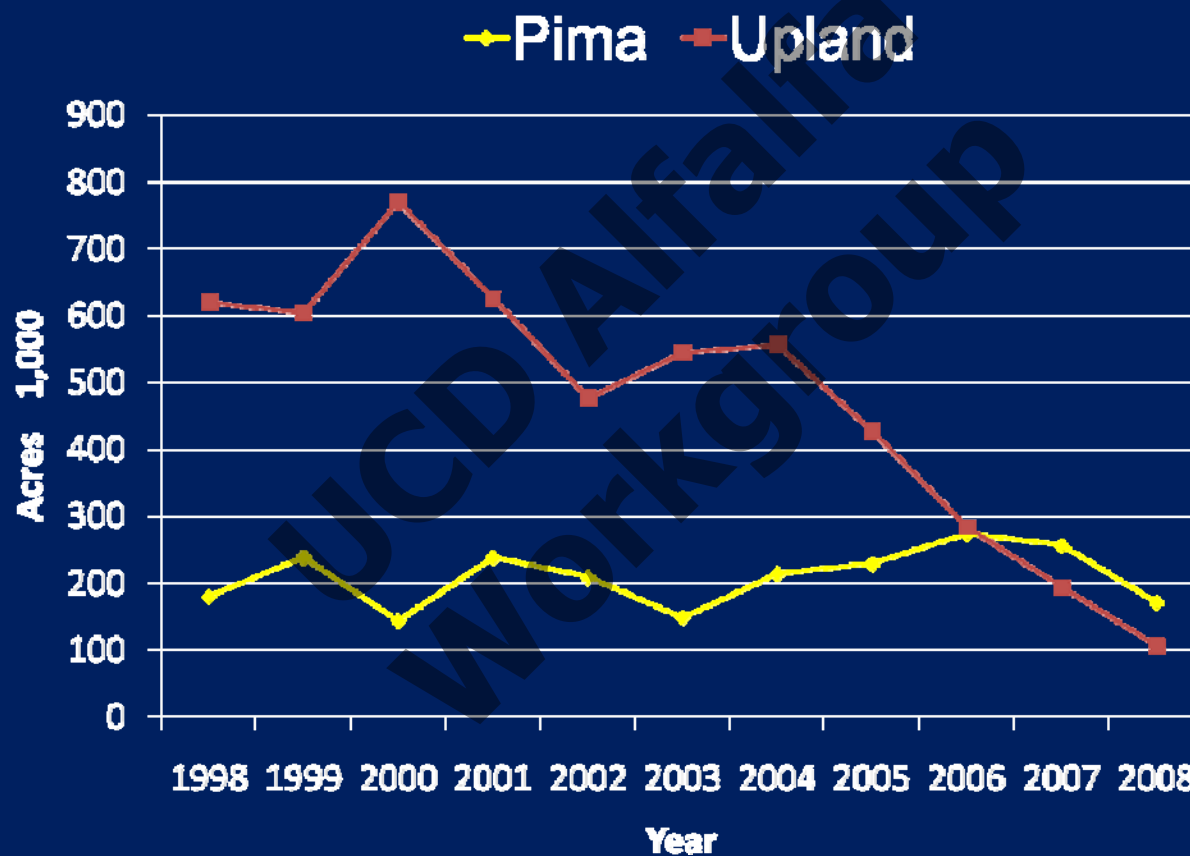


What have been the reasons for the high feed costs?

2. Pressures from reduced cottonseed production

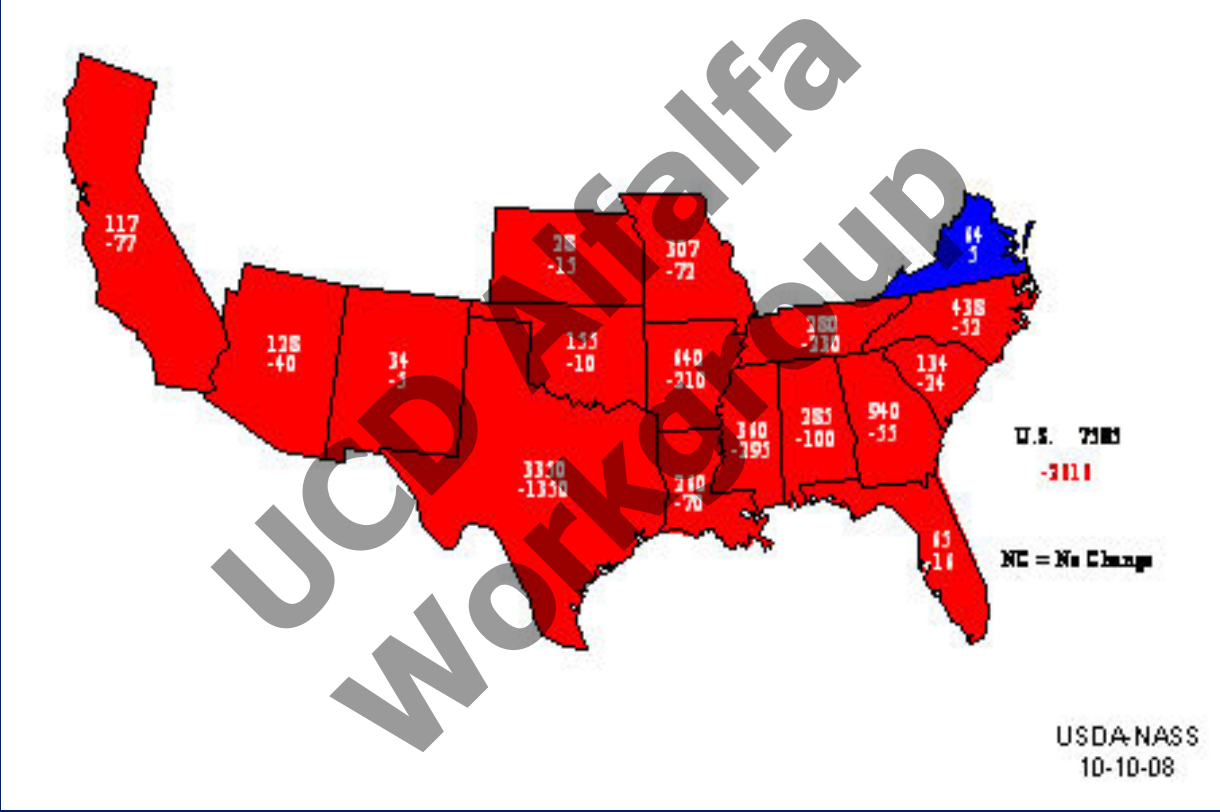


# Pima and Upland Cotton Production - CA

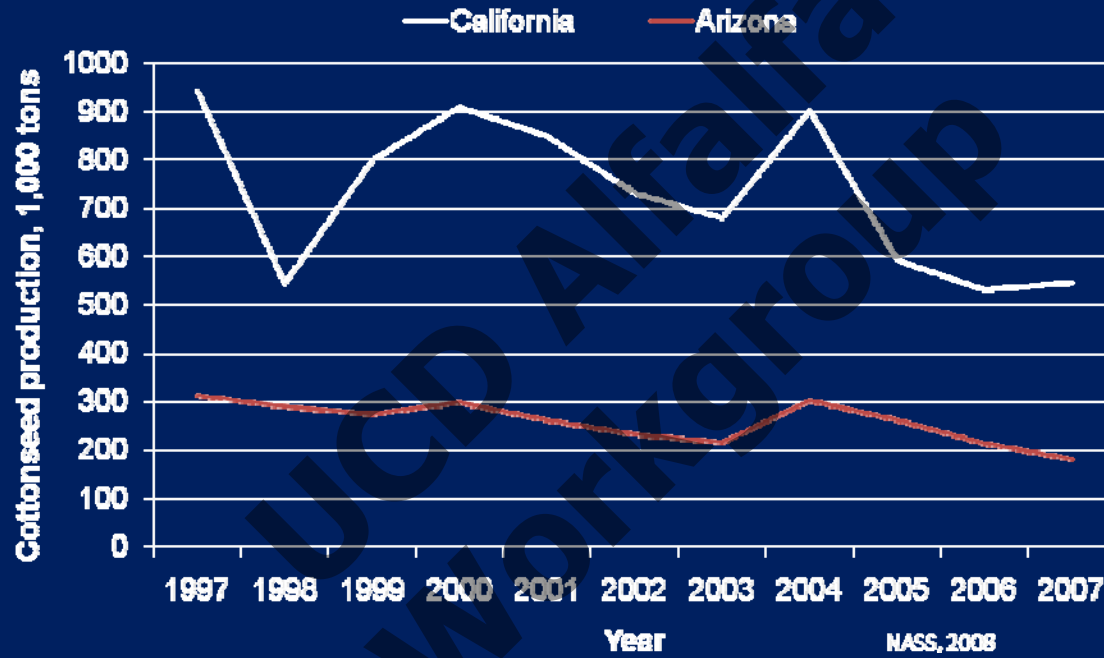


# 2008 Upland Cotton Harvested Acres

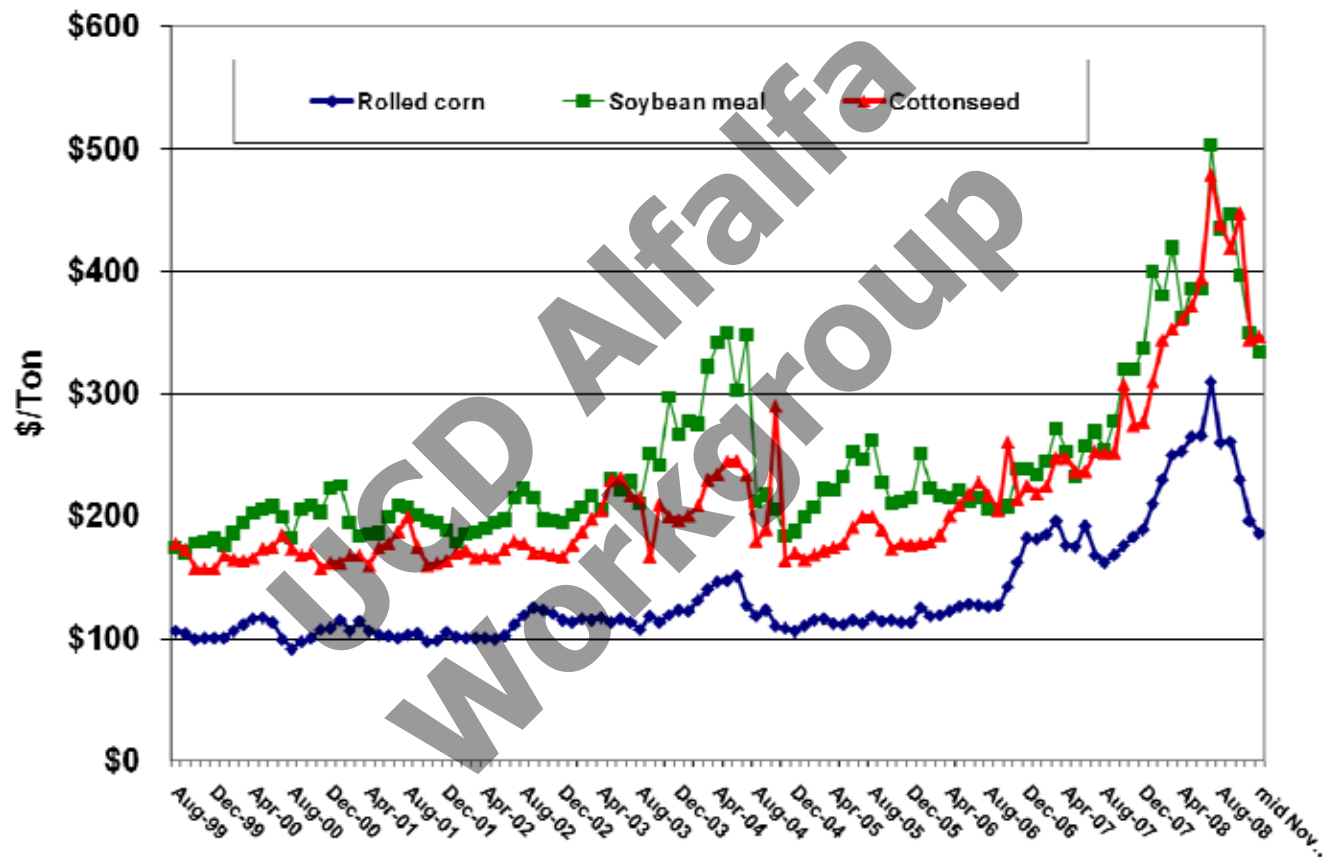
Acres (1,000) and change from previous year



### Cottonseed Production for California and Arizona



### Rolled Corn, SBM and Cottonseed Prices



# How Will We Feed Cows in the Future?

- Future Trends
  - ❖ Forages
  - ❖ Byproduct feeds

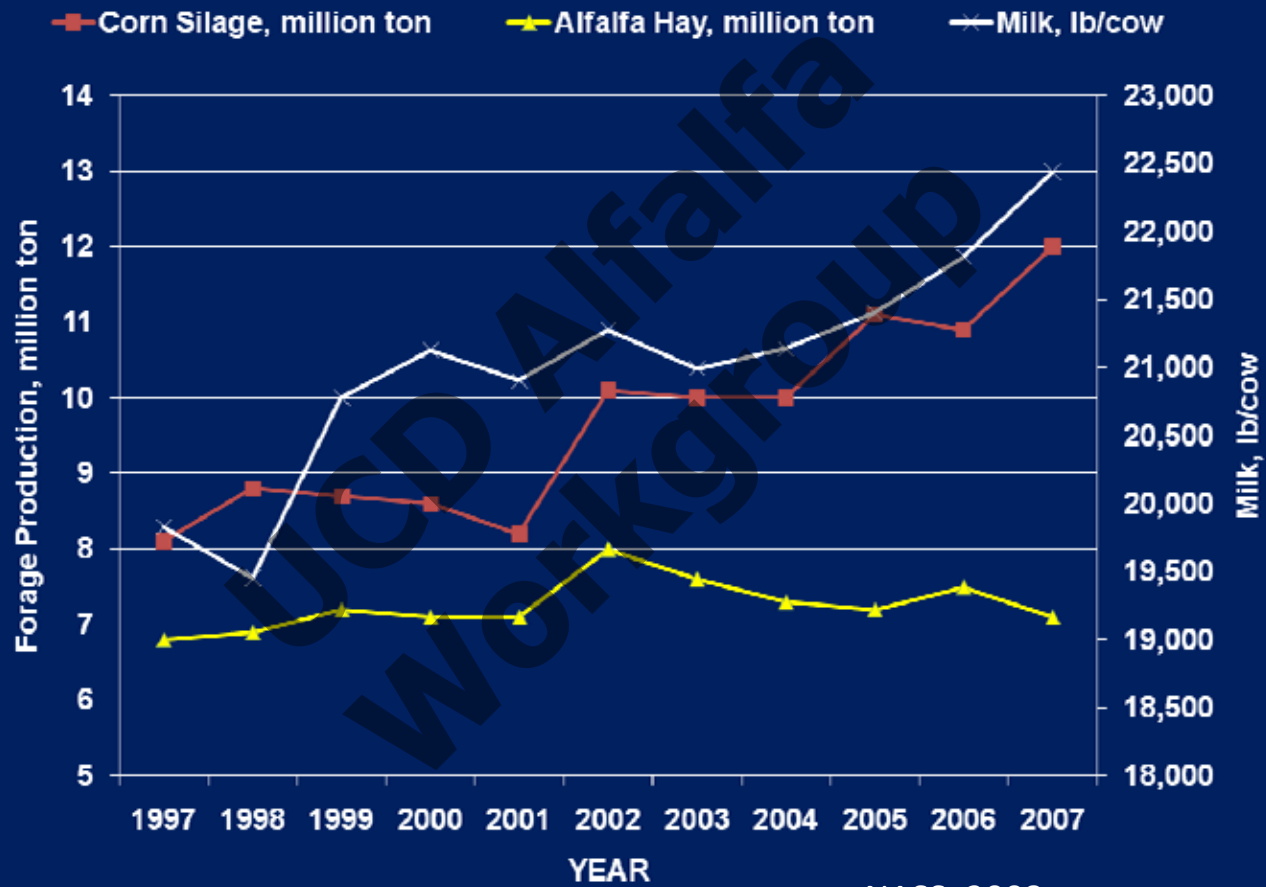
UCD Alfalfa  
Workgroup

## Forage Feeding Trend

- Feeding more corn silage and fewer legumes and grass forages
- Corn Silage
  - Fiber source
  - Starch Source
  - Decreases corn grain in the diet.

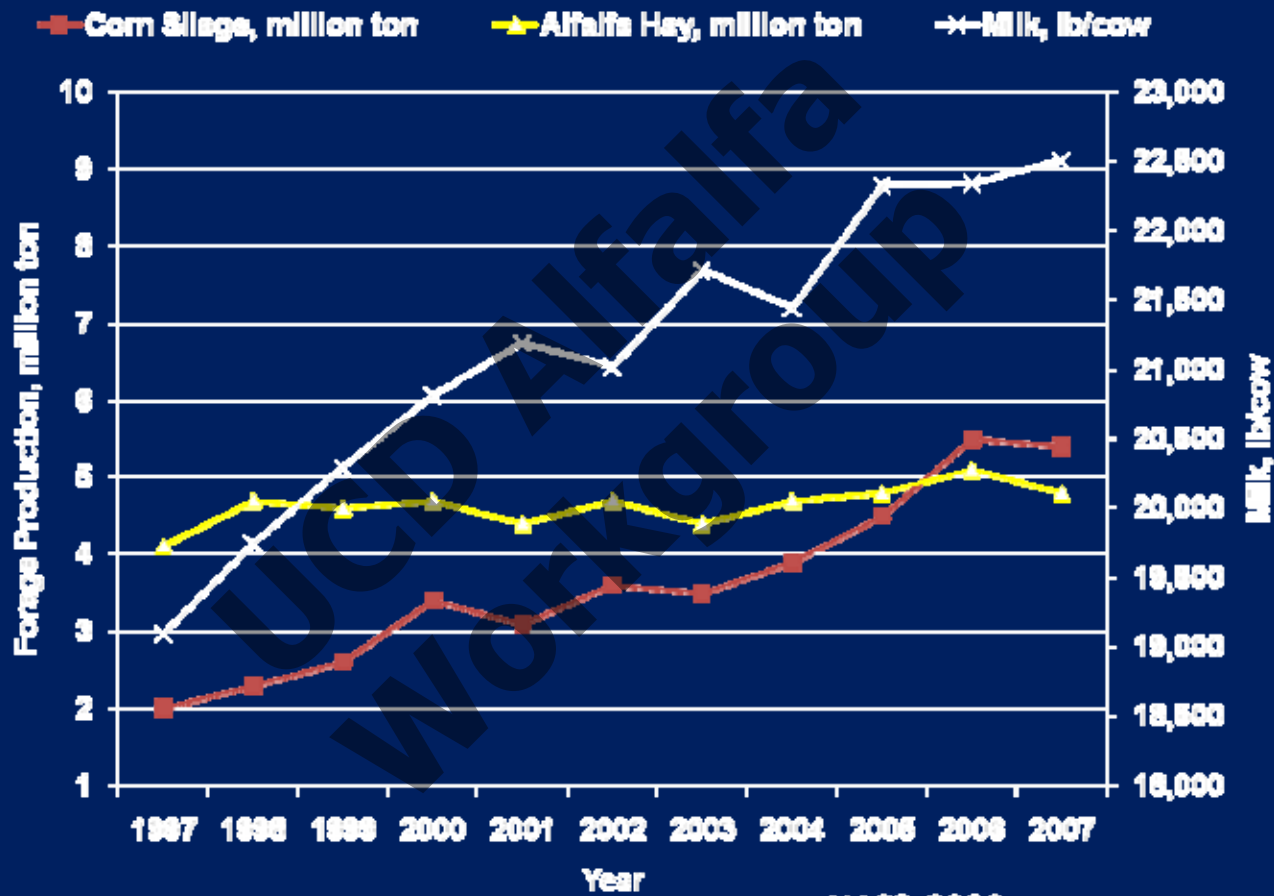


# California

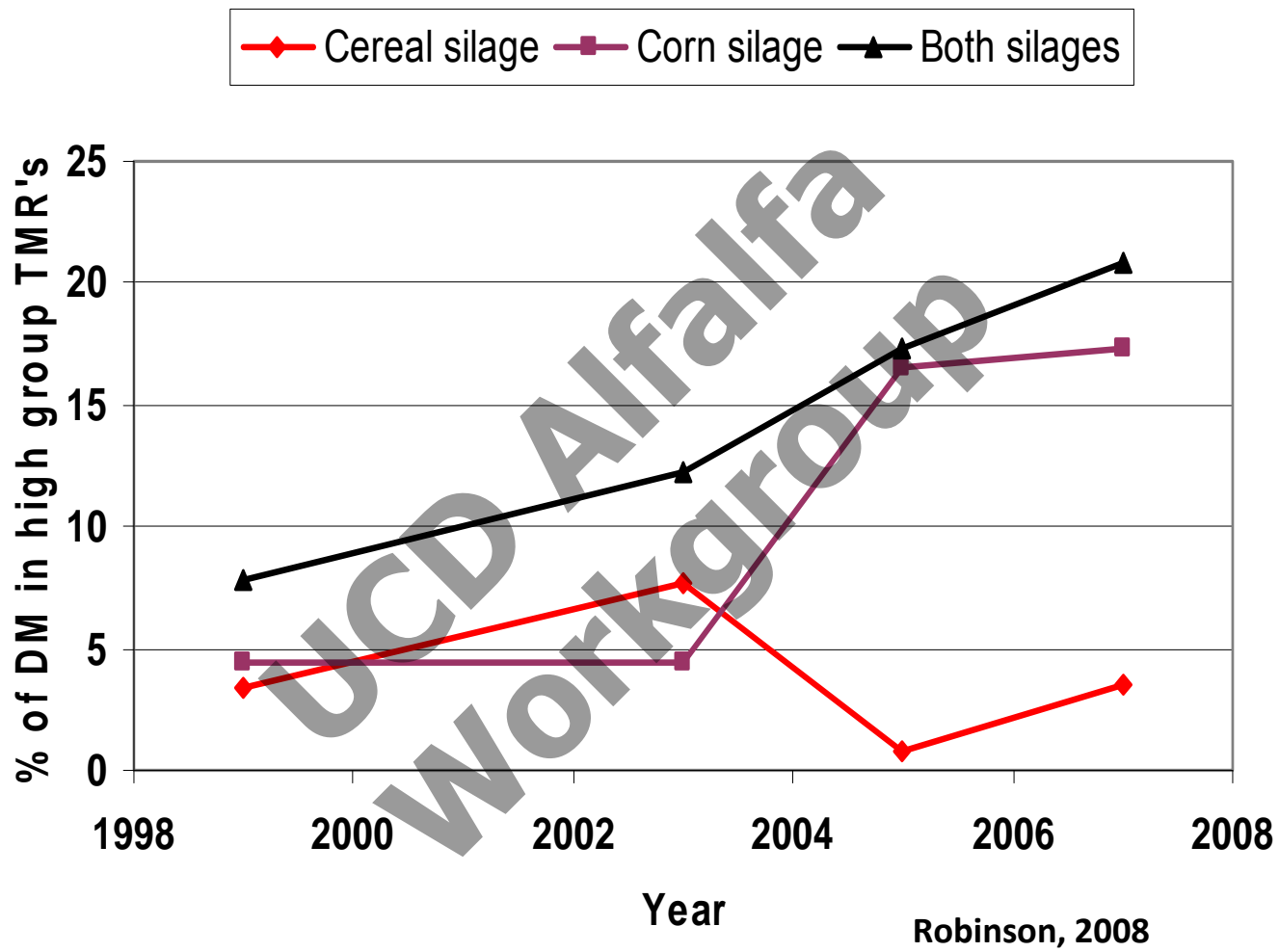


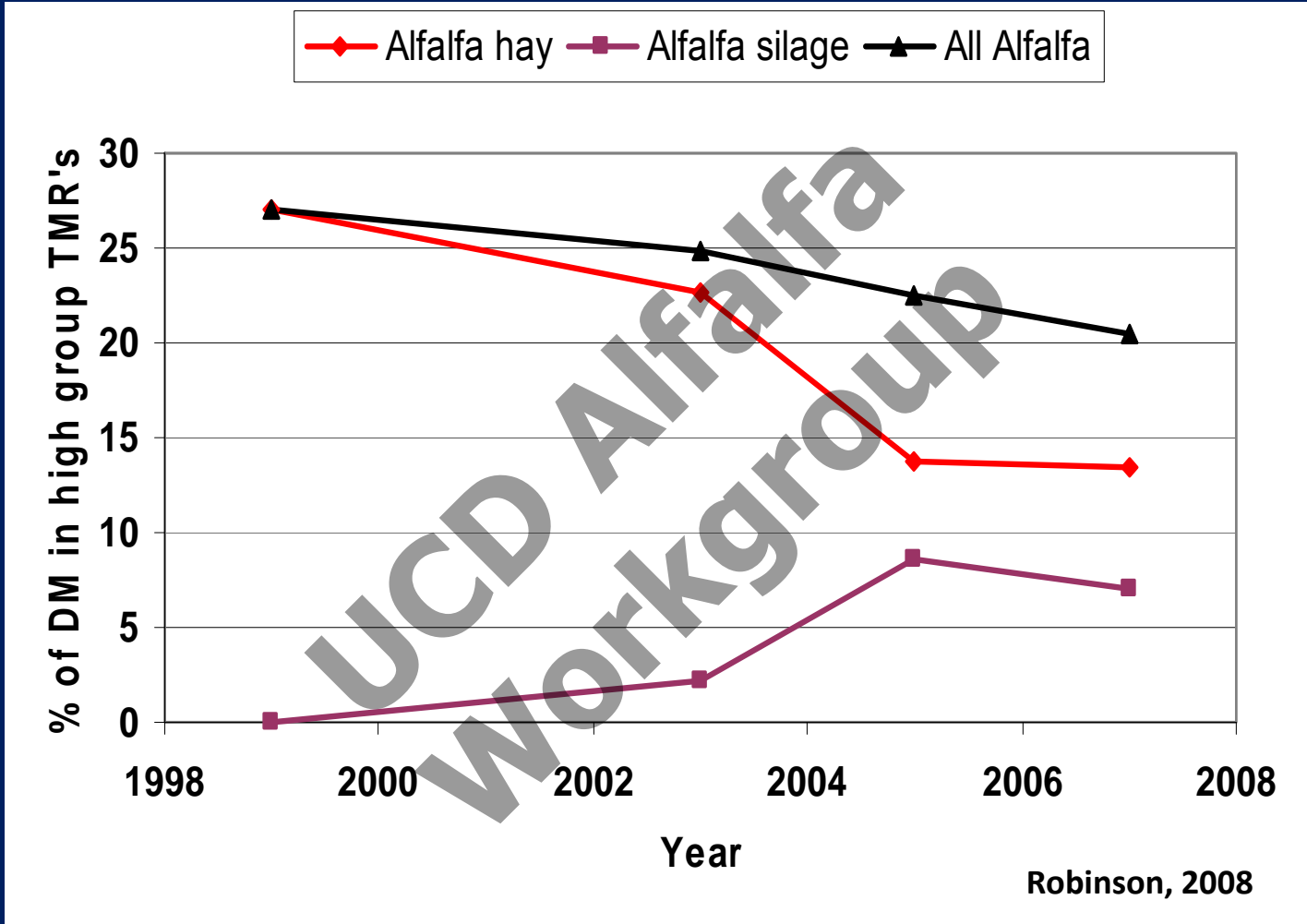
NASS, 2008

# Idaho

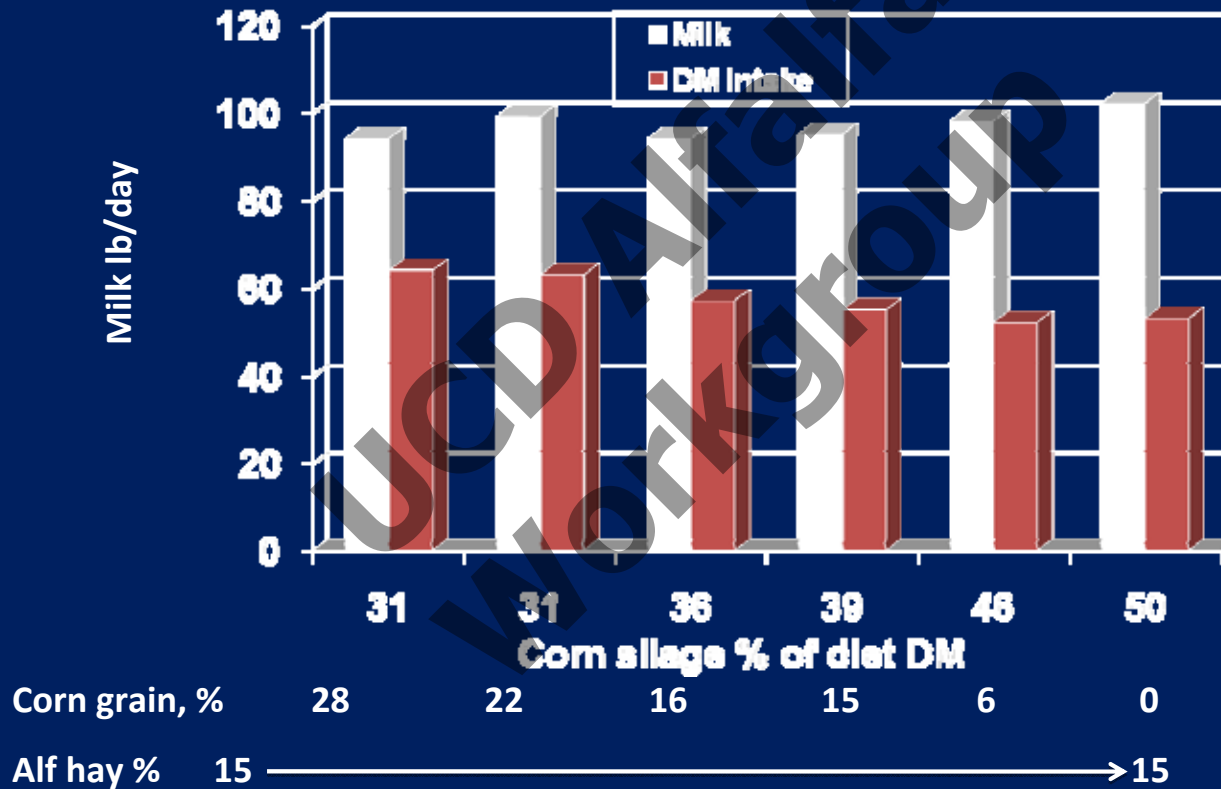


NASS, 2008





# Production Response to Corn Silage Multiparous Cows – Early Lactation



Allen (2001), Univ. of Minnesota

# Why the Trend for Increased Corn Silage Feeding?

## Agronomic Factors

Factor	Alfalfa	Corn Silage
Planting	Tri-annual?	Annual
Harvest	6-8/year	1/year
Process	Cut	Cut/chop
	Rake	
	Chop/bale	
Yield	7.2 Ton/acre <sup>1</sup>	27 Ton/acre <sup>1</sup>

<sup>1</sup>As fed basis- NASS, 2008

## Corn silage advantages

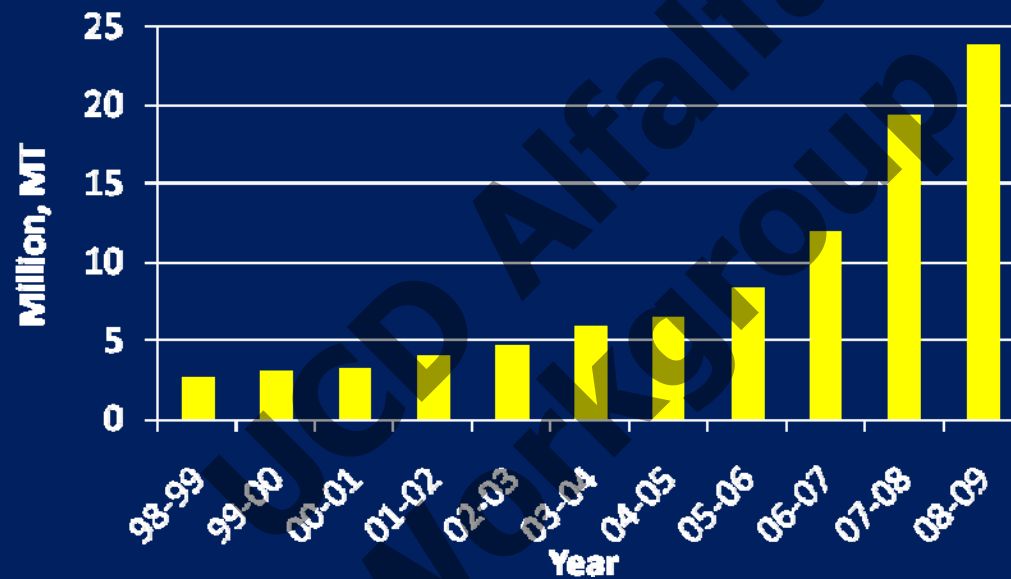
- More consistent rations
- More palatable ration
- More Mcal of energy per acre
- Corn ground can handle heavy levels of manure

## CHALLENGES WITH HIGHER CORN SILAGE LEVELS

- Increased purchased proteins
- May require dry hay or straw for proper effective fiber
- Particle size can be important. Processed corn silage has definite advantages over unprocessed corn silage.
- Eggs are in “one basket” to a great degree. That’s good if you harvest high quality corn silage but bad if corn silage digestibility is low.
- Need to have two to three months of additional inventory. Corn silage fermented less than two months doesn’t perform as well as fully fermented corn silage.
- Greater risk of acidosis if effective fiber is not managed properly.

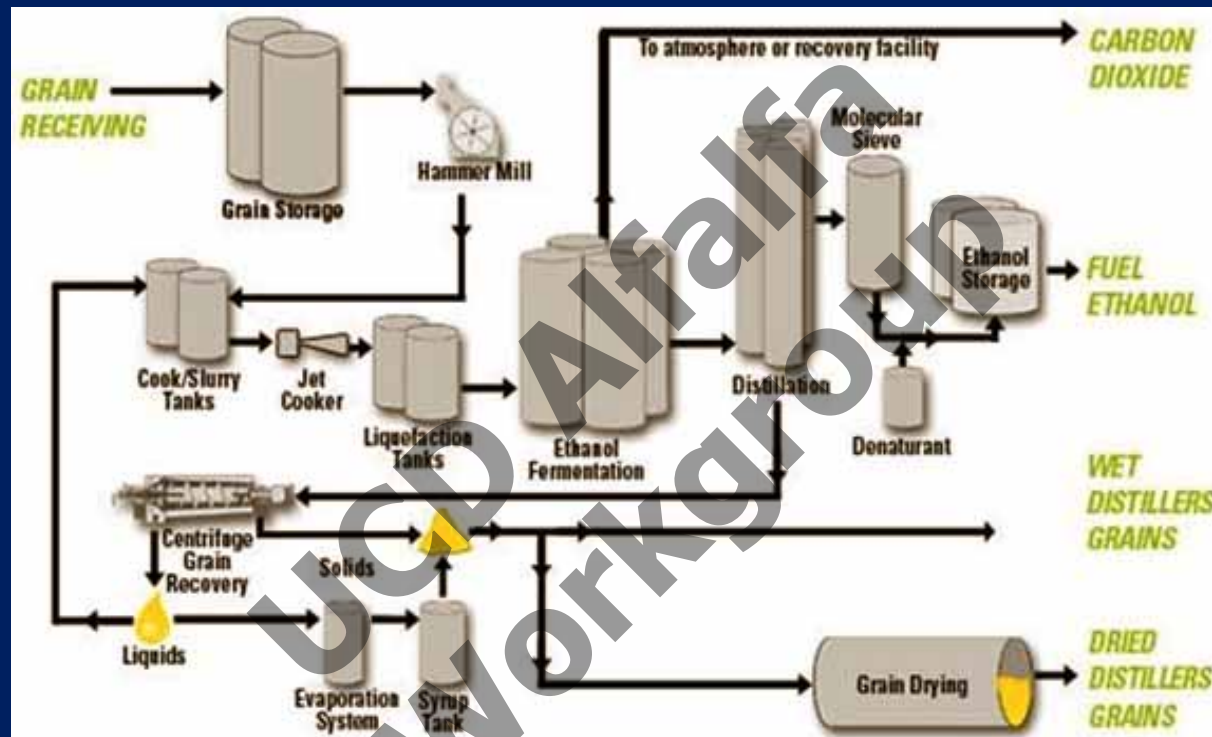
# Trends in Byproduct Feeding

## Distillers Grain Production in the U. S.



The national dairy herd of approximately 9 million cows would need to consume 7.2 lb of DG per day over a 305 d lactation to balance the supply.

# Ethanol Production Process



- **Wet Distillers Grains**

- Corn is processed, mixed with yeasts that converts the starch into ethanol and  $\text{CO}_2$ . The ethanol is distilled off and the remaining liquid is spun off to remove water. Residue is called wet distillers grains. Around 35% dry matter.



- **Condensed Distillers Solubles**

- Liquid removed by centrifuging is usually dried and becomes condensed distillers solubles. The solubles are added back to the wet distillers grains, making wet distillers grains with solubles.. The wet products are either fed as is or are heat dried, producing dried distillers grains with solubles.



# Limitations to Feeding Byproducts

- **Starch**

- Highly fermentable by rumen bugs. Produces propionic acid. Converted to glucose by liver. Used to make milk.

- ~25% diet DM for high milk production.

- Most byproducts have little to no starch but they do contain significant quantities of sugars, organic acids, fructans, glucans and pectins. Provide energy to rumen microbes.

Feed	% starch (as fed)
<b>Corn</b>	<b>62.0</b>
Corn Gluten Feed	12.0
Cottonseed	1.0
<b>Distillers Grains</b>	<b>10.0</b>
Soybean hulls	1.0
Millrun	21.0

# Limitations to Feeding Byproducts

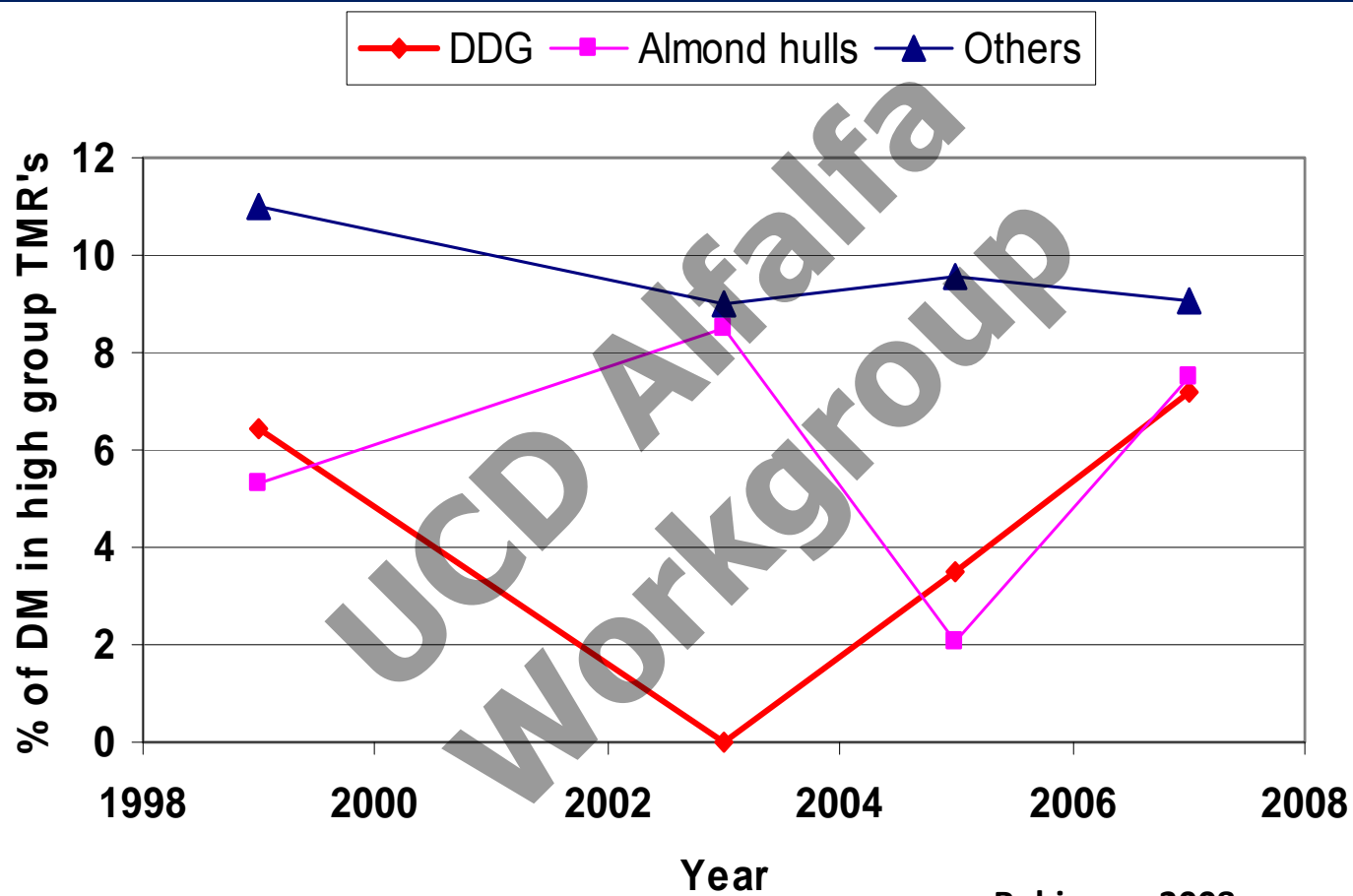
- Phosphorus
  - Most by-products 2-3x corn.
  - Increased P excretion in manure.

Feed	% P (as fed)
<b>Corn</b>	<b>0.27</b>
Corn Gluten Feed	1.00
Cottonseed	0.60
<b>Distillers Grains</b>	<b>0.70</b>
Soybean hulls	0.10
Millrun	0.80

# Limitations to Feeding Byproducts

- Protein
  - Most byproducts 2-3x corn.
  - Increased N excretion.
  - May cause issues in the waste management area.

Feed	% CP (as fed)
<b>Corn</b>	<b>9</b>
Corn Gluten Feed	24
Cottonseed	24
<b>Distillers Grains</b>	<b>28</b>
Soybean hulls	10
Millrun	19



Robinson, 2008

## Studies examining levels of dried distillers grains for lactating cows.

<b>n<sup>1</sup></b>	<b>DG, (% of DM)</b>	<b>DMI, (lb/d)</b>	<b>Milk, (lb/d)</b>	<b>Fat, (%)</b>	<b>Protein, (%)</b>
29	0	48.9b	72.8ab	3.39	2.95a
13	4 to 10	52.2a	73.6a	3.43	2.96a
34	10 to 20	51.6ab	73.2ab	3.41	2.94a
15	20 to 30	50.3ab	73.9a	3.33	2.97a
7	>30	46.1c	71.0b	3.47	2.82b

<sup>1</sup>=# of treatment comparisons included in meta-analysis (24 total studies).

Kalcheur et al., 2005

<sup>ab</sup>Means in columns with different superscripts differ ( $P < 0.05$ )

# What are Distillers Grains Worth?

- Generally replaces corn and soybean meal
- CP (28%) and Energy 0.80 Mcal/lb) ~same as a 50:50 mix of corn and 47% soybean meal
- Therefore, on an energy and CP basis:  
1 lb distillers grains replaces:  
0.5 lb corn and 0.5 lb SBM
  - Break-even price of DDGS (\$/ton)-  
={Corn (\$/bu) x 17.85} + {SBM (\$/Ton) x 0.5}  
Example: (\$7 x 17.85) + (\$275 x 0.5)  
Distillers Price= \$263

# Summary

- Increased growth of ethanol plants across the U.S. has increased the demand for corn grain.
- This has resulted in historically high corn prices.
- By increasing forages such as corn silage, partial replacement of corn can be achieved.
- Use of distillers grains or other by-products in dairy rations can also be utilized to also offset higher grain prices.
- Milk production caps from creameries will also dictate to some degree what feedstuffs are utilized in dairy rations.