THE NEED FOR EXPANSION AND THE CHALLENGES WITH GROWING THE DAIRY HERD

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Pictures by Bonnie Mohr http://www.bonniemohr.com/

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Why Discuss Herd Expansion

✓ European quota will end on April 1, 2015

✓ It will create opportunities for individual farm growth in many European countries

✓ It will also create opportunities for veterinarians to change how they offer services to their clients
  - It will result in new challenges and a different mind set for providing veterinary services
  - The traditional services of focusing on individuals will still be important, but there will be a shift to herd-based decisions and evidence-based production medicine in larger herds
Why Am I The One Presenting?

✓ I DO NOT KNOW???

✓ I ASKED MYSELF THE SAME QUESTION WHEN ANEMBE INVITED ME!!!
Scope of Presentation

 ✓ Current structure of the dairy industry in the US

 ✓ The rationale for the consolidation and expansion of dairy farms

 ✓ The challenges with dairy expansion

 ✓ Economic limits

 ✓ The shifts in services needed
Why Has This Happened?

Good old days .......

Current and future days .......

http://www.bonniemohr.com
US Milk Product Consumption


Source: USDA, ERS, “Livestock, Dairy and Poultry Outlook”

Source: USDA, AMS weekly “Dairy Market News” reports.
Milk is a Commodity

✓ Even if we had “Denomination of Origin” or added value such as organic, locally produced, cows on pasture, milk rich in CLA, milk rich in ω-3 FA, etc, most people buy milk based on price

  ▪ Milk is a wholesome product and of highest quality (conventionally produced milk provides the same attributes as any of the above milk)

  ▪ Milk prices are dictated by local and international markets
    • Obeys the laws of supply and demand

✓ In a commodity market, efficiency of production and economy of scale pays more than added value
US All Milk Price

High of US $0.45/L

Low of US $0.27/L

1961-1981 +225%

1983 - 2013 +44%
The Health of the US Dairy Industry is Dependent on Exports

✓ Today, 17% of the US production (total solids base) is sent somewhere in the world

US Dairy Export Council, June 2014
Dairy Farms in the US are Consolidating

✓ The average US farm produces ~ 2,000 tons of milk/year

✓ However, ~60% of the cow inventory and ~65% of the milk is produced by 3.3% of the farms

✓ There are ~1,650 farms with > 500 cows that produce 62 million tons of milk (~ 38,000 tons of milk/farm/year)

The average farm is still small (190 cows/farm)

However, we have fewer and larger farms every year

USDA, 2014
Fair Oaks Dairy

- Fair Oaks Farms occupies approximately 10,000 ha (100 km²)
- Milk ~ 32,000 Holstein cows
- Produce daily 1.15 million kg of milk/day (enough to supply all the daily milk needs of Madrid)

*Sustainability isn't just something we claim, it's how we live.*

http://fofarms.com/ - Fair Oaks, Indiana
It is very difficult to provide future perspectives to the next generation with a small dairy.

Dairy farms in the US have to survive the volatility of the economy:
- Loss of $400/cow/year to a profit of $1,000/cow per year
- Typical expectation is $250 to 300 profit/cow/year (5 to 7% of gross income)

How many cows does one need to meet his/her financial aspirations and survive the bad years?

How many cows does one need to meet his/her financial aspirations and survive the bad years?
What Are the Perceived Issues with Expansion?

✓ Ownership: family vs. corporation?

✓ Labor: family vs. hired?

✓ Size: few cows vs. many cows?

Almost all large US dairy farms are owned by families. Most employees have families too.
Dairies in the United States are Family Owned and Operated Farms

US Department of Agriculture Statistics Services (2007)
What Are the Perceived Issues with Expansion?

- Environmental impact: more cows, more localized pollution
- Animal welfare: Wrong notion that large farms do not care for the well-being of their cows
- In a simplistic view, the US needs 4,500 dairy farms with 2,000 cows each
Production Efficiency and Pollution are Inversely Related

The dairy industry has applied sustainable intensification to mitigate its environmental footprint

Frank Mitloehner, UC Davis
Dairy Dreams
3,000-milking cow dairy in the Green Bay area, WI

<table>
<thead>
<tr>
<th>Year</th>
<th>Milk</th>
<th>ECM</th>
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<tr>
<td>2007</td>
<td>37.5</td>
<td>*</td>
</tr>
<tr>
<td>2008</td>
<td>35.6</td>
<td>*</td>
</tr>
<tr>
<td>2009</td>
<td>38.0</td>
<td>*</td>
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<tr>
<td>2010</td>
<td>37.8</td>
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<td>2011</td>
<td>37.6</td>
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<td>2012</td>
<td>38.9</td>
<td>41.0</td>
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<tr>
<td>2013</td>
<td>38.8</td>
<td>40.7</td>
</tr>
<tr>
<td>2014</td>
<td>39.5</td>
<td>42.1</td>
</tr>
</tbody>
</table>

Don Niles, owner
Shockwave of Environmentalist Activity

Spray Irrigation of Manure is TOXIC to Human Health!
ECOLI - ANTHRAX - MRSA
kewaunecares.wordpress.com
The US Is Not Alone

DairyNZ New Zealand Dairy Statistics 2012-2013
New Zealand Farms Have Become More Efficient

The increased from:

650 → 1,000 kg of milksolids per ha/year (equivalent to 14,500 kg of milk with 3.7% fat and 3.3% true protein)

250 → 350 kg of milksolids per cow/year (equivalent to 5,000 kg of milk with 3.7% fat and 3.3% true protein)
Demographics of the Spanish Dairy Industry

Source: FEPLAC & MARM
US Milk Production Per Cow

Production has increased 13% in the last 10 years

What Are the Major Concerns with Expansion?

✓ Impact to existing operation (hard to expands a milk barn / remodel without materially impacting on-going operations)
  ▪ Restructuring and reassessing labor needs → huge issue in many farms

✓ Bringing in “outside” livestock – potential health issues

✓ Potential for cost overruns as these are typically large projects that cannot always be estimated effectively on paper at onset.

✓ Volatility of milk prices (milk price today vary considerably from milk prices when the expansion is complete)
What Are the Major Concerns with Expansion?

✓ Acquisition of additional cows can vary significantly (value might differ between what the bank will give credit for compared with the value you finally purchase)

✓ Permit acquisition in a given area (meeting air and water quality requirements)

✓ Must have a commitment from a processing plant to accept the additional milk

✓ Quality and reputation of contractor must be carefully considered
When to Start Milking

✓ Multiple models
  - Grow herd in advance of barn expansion
    • Young animals purchased and raised on farm during expansion
  - Grow herd slowly after expansion is complete
    • Grow from within and slowly purchase animals
  - “Big Bang” approach – add additional cows to reach new capacity after expansion is complete
    • Buy prepartum heifers and milking cows once the expansion is complete
  - Some combination of the above
Introduction of Diseases

✓ Real problem, particularly when purchasing lactating cows
  ▪ Mastitis caused by contagious agents (Streptococcus agalactiae, Staphylococcus aureus, and Mycoplasma spp)
  ▪ Contagious viral diseases: BVDV, IBR, BLV
  ▪ Contagious bacterial diseases: paratuberculosis, Leptospira borgpetersenii serovar hardjo (L. hardjo-bovis), digital dermatitis, etc

✓ Testing purchased animals vary with type of animal purchased (heifer vs. lactating cow) and level of risk the producer is willing to take

✓ Most producers in the US during expansion will:
  ▪ Test all animals for BVDV PI (IHC)
  ▪ Bacteriology of milk for lactating cows (culture milk or PCR)
  ▪ Have a health plan for receiving animals (metaphylactic use of antimicrobials on arrival if needed, vaccination program on arrival, segregate animals for some period of time
Cow Comfort and Cow Flow Are Pivotal When the Expansion Aims High Production

US tunnel ventilated free-stall barn

Israeli compost barn
Cow Comfort and Cow Flow Are Pivotal When the Expansion Aims High Production

Transfer lanes and access to parlor
Transition Cow Facilities Should Be Designed to Account for Seasonality of Calving

Many guidelines underestimate space needs
✓ A minimum of 15 to 18 m²
✓ Handle 120 to 130% of the average calvings/month
✓ E.g. Average calving is 100/month: design facilities to handle 120 to 130 cows/month
Stalls for transition cows should be larger:
- 1.28 to 1.32 m wide
- 2.8 to 3.0 m long

Easy access to calving area and to calf housing:
- Individual calving pens (15 m²) or common calving area
- Most producers use what has been referred to as “Just in Time Calving”
Design Group Sizes According to Parlor Throughput

✓ Group size is dependent on parlor size and cow throughput
✓ Ideally, the group of cows should not spend more than 45 min in the parlor for prepping and milking per milking session
  ▪ Critical if milking 3 x or more often/day
How do Large Farms Perform?

Incidence of Health Problems

<table>
<thead>
<tr>
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<th>Cows per farm</th>
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<tbody>
<tr>
<td>clinical mastitis</td>
<td>&lt;100</td>
</tr>
<tr>
<td>lameness</td>
<td>100-499</td>
</tr>
<tr>
<td>infertility problems</td>
<td>&gt;=500</td>
</tr>
<tr>
<td>milk fever</td>
<td>&lt;100</td>
</tr>
<tr>
<td>displaced abomasum</td>
<td>100-499</td>
</tr>
</tbody>
</table>

USDA-NAHMS (2009)
# How do Large Farms Perform?

## Herd size: DHIA (Milk Test) Results

<table>
<thead>
<tr>
<th># cows / farm</th>
<th>min</th>
<th>1</th>
<th>51</th>
<th>101</th>
<th>201</th>
<th>501</th>
<th>1001</th>
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<td>max</td>
<td></td>
<td>50</td>
<td>100</td>
<td>200</td>
<td>500</td>
<td>1000</td>
<td>2000</td>
<td>9999</td>
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</table>

<table>
<thead>
<tr>
<th></th>
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<th>4850</th>
<th>2823</th>
<th>1464</th>
<th>463</th>
<th>199</th>
<th>71</th>
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</thead>
<tbody>
<tr>
<td>Number of farms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Herd size</td>
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<td>71</td>
<td>138</td>
<td>303</td>
<td>691</td>
<td>1346</td>
<td>3211</td>
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<tr>
<td>Annual cull rate, %</td>
<td>36</td>
<td>37</td>
<td>38</td>
<td>38</td>
<td>39</td>
<td>40</td>
<td>41</td>
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<tr>
<td>Annual death rate, %</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>7</td>
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<td>Somatic cell count</td>
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<td>249</td>
<td>243</td>
<td>233</td>
<td>210</td>
<td>201</td>
<td>214</td>
</tr>
<tr>
<td>Calving interval, months</td>
<td>14.0</td>
<td>13.8</td>
<td>13.7</td>
<td>13.5</td>
<td>13.2</td>
<td>13.0</td>
<td>13.1</td>
</tr>
<tr>
<td>Annual milk yield, kg/cow</td>
<td>8517</td>
<td>9318</td>
<td>9722</td>
<td>10361</td>
<td>11294</td>
<td>11554</td>
<td>11356</td>
</tr>
</tbody>
</table>
Sources of Income for a Dairy Farm (2009 to 2010)

- Milk
- Sale of prepartum cows
- Sale of cows for dairy purposes
- Sale of cows for beef
- Sale of bull calves

Data used (2 large high-producing dairy herds)
- Production per cow = 12,500 kg/year
- Price of milk = $0.30/Kg
- Value of a prepartum heifer = $2,000
- Value of a bull calf = $30
- Value of a cows sold to dairy = $1,600
- Value of cull cow = $600
- Mortality of cows = 5.7%
- Replacement = 28.1%
- Herd turnover = 33.8%
- Calvings/year = 132% of lactating herd
- Stillbirth = 8%

Cost of Producing Milk in the US (May 2014)

### Operating Costs ($0.36/kg)
- **Feed costs**: 81.2%
- **Veterinary products & services**: 4.5%
- **Nutrient management**: 1.4%
- **Marketing**: 4.8%
- **Custom services**: 3.3%
- **Fuel, lube, and electricity**: 1.4%
- **Repairs**: 0.1%
- **Interest on operating capital**: 3.2%
- **Hired labor**: 4.8%
- **Opport. cost of unpaid labor**: 3.3%
- **Recovery of machinery and equipment**: 0.3%
- **Opport. cost of land (rent)**: 2.3%
- **Taxes and insurance**: 8.4%
- **General farm overhead**: 18.0%
- **Overhead costs**: 27.0%

### Overhead Costs ($0.18/kg)
- **Hired labor**: 18.0%
- **Opport. cost of unpaid labor**: 27.0%
- **Recovery of machinery and equipment**: 44.0%
- **Opport. cost of land (rent)**: 0.3%
- **Taxes and insurance**: 2.3%
- **General farm overhead**: 8.4%

USDA ERS (2014) Milk cost of production estimates
Large US Dairy Farms Are More Efficient

- Each dot represents an observation on average total economic cost.
- Economic costs decrease with farm size and exceed average revenues for small dairies.
- The inefficiency of each farm can be measured by the vertical distance between the dot and the minimum average cost (solid line).

Mosheim and Lovell (2009) AJAE91
Cost to Produce Milk in 2012

Includes large opportunity cost of unpaid labor for smaller farms

USDA-ERS (2014)
California Data
(Luis Rodriguez et al.)

- Charter dairies monitored by the CA Department of Food and Agriculture
- A sample of herds (132 to 166) that represent approximately 9% of the CA dairy farms
- Only conventional dairies
- Breeds: Holsteins, Jerseys, and Crossbred
- Herd size analyses included dry cows
- Milk net income = mailbox price – total cost
- Does not include management costs (manager’s salary)
Total cost/45 kg of milk decreases as herd size increases

Rodriguez et al. (2014) ADSA Discover Conf.
Milk net income/45 kg of milk increases as herd size increases.

Rodriguez et al. (2014) ADSA Discover Conf.
Net Income/45 kg of Milk By Herd Size and Milk Yield

Milk yield/cow is critical for increased income regardless of herd size

Rodriguez et al. (2014) ADSA Discover Conf.
Relationship Between SCM and Feed Efficiency (2006-2012)

- $R^2 = 0.5985$
- $R^2 = 0.6391$
- $R^2 = 0.3993$

Feed efficiency vs. Solids-corrected milk, kg/d

- Holstein
- Jersey
- Cross

Rodriguez et al. (2014) ADSA Discover Conf.
Veterinary Services Change

✓ In small farms (50 to 100 cows), one veterinarian might provide services to 30 to 40 clients
  ▪ 1,000 to 4,000 cows
  ▪ He/she is the main source of information to producers

✓ In large herds (1,000 to 3,000 cows), one veterinarian provides services to 5 to 10 clients
  ▪ 10,000 to 30,000 cows
  ▪ Many sources of information

✓ A small producer relies on his/her veterinarian to provide technical information

✓ A large producer can and will hire any consultant they want
Veterinary Services Change

✓ In large herds, there is a need for fewer and more specialized veterinarians
  ▪ Creates opportunities for consulting and specialized services

✓ But it also creates a different dimension of competition
  ▪ Pharmaceutical companies, AI companies, nutrition companies, consulting firms, labor firms, coaching and personnel training groups, etc

✓ The veterinarian is no longer the sole source of information, but he/she becomes a very important filter of what gets to the producer and how the producer uses the information
Veterinary Services Change

✓ The veterinarian will be less involved with individual cow decisions and more involved with herd-based decisions

- Building protocols for animal health
  - Peripartum health
  - Reproductive programs
  - Milk quality and mastitis programs
  - Treatment protocols

- Evidence-based production medicine
- Training personnel
- Calf rearing and replacement programs
- Nutrition
- Feed acquisition
- Facility planning and expansion

Remember, this represents only 4.5% of the operating costs of milk production

Remember, this represents ~80% of the operating costs of milk production
Summary

✓ Expansion and consolidation of the dairy industry is here to stay

✓ Growth is important for the future success of the individual farm
  ▪ However, growth should combine improved individual animal production and economic efficiency
  ▪ Focus on fundamentals, what is right for the cow and what is right for the business

✓ Have a business plan for expansion

✓ Take advantage of economy of scale, but produce larger volume efficiently → growth with sustainable intensification

✓ Spend money wisely and use technologies that give evidence of economic return, control the controllable
So What Does “Staying Ahead in the Dairy Business” Mean Now?

✓ The rest of the dairy industry is constantly improving
  ▪ 3,000 cows and competent is no longer a guarantee of success in Wisconsin

✓ More cows (and more manure) may not be a local option