4th October 2016, Obihiro

Gitte Grønbæk, Director
SEGES Dairy & Beef Research Centre

FROM FARMER TO BUSINESS MAN
SEGES - WE CREATE VALUE
- FROM A NUMBER OF DIFFERENT FUNCTIONS

6 business areas
- SEGES Dairy & Beef Research Centre
- SEGES Crop & Environment
- SEGES Business Finance & Management
- SEGES Pig Research Centre
- SEGES Horses
- SEGES Organic Farming

3 business units
- SEGES Academy
- SEGES Publishing
- SEGES Software

650 employees in 6 locations
850 million DKK annual turnover
A limited partnership company in Danish Agriculture & Food Council
A part of Agro Food Park
BRIDGE BUILDER

- SEGES fills the role as the bridge builder between research and practical farming
- We focus our efforts on developing products and services in cooperation with our users
- We make sure that the new knowledge and technology quickly come into use on the Danish farms
VIDEO!!
OVERVIEW OF DANISH DAIRY 2016

SEGES Dairy & Beef Research Centre
DANISH DAIRY FARMING OVERVIEW

- Today 3,200 family owned dairy farms
- About 10% are organic
- On average 175 cows per farm (50 – 2,000)
- On average 2 employees per farm (0 – 20)
- Total milk production 5.250 million kg/year
- Mostly Holstein (72%), some Jersey (14%) and a few VikingRed
  - Totally around 575.000 dairy cows in Denmark
- 2/3 of the production is exported

<table>
<thead>
<tr>
<th>Milking system</th>
<th>% of farms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tied-up housing (phased out in 2025)</td>
<td>16%</td>
</tr>
<tr>
<td>Rotary</td>
<td>6%</td>
</tr>
<tr>
<td>Herringbone</td>
<td>45%</td>
</tr>
<tr>
<td>Side-By-Side</td>
<td>9%</td>
</tr>
<tr>
<td>AMS / Robotic</td>
<td>24%</td>
</tr>
</tbody>
</table>
MILK PRODUCTION

[Graph showing milk production from 1990 to 2014, with labels for Organic and Konventionel]
DEVELOPMENT IN MILK YIELD (ECM KG) FOR DANISH HOLSTEIN COWS 2004 – 2016
DANISH DAIRY BUSINESS MODEL - BUILDING ON MORE THAN 100 YEARS OF EXPERIENCE

- Farms owned by farmers
  - Legislation
  - Financial possibilities
    - Danish Mortgage Model 1850. An organization of members (lenders).
DANISH DAIRY BUSINESS MODEL - BUILDING ON MORE THAN 100 YEARS OF EXPERIENCE

- Farmer owned co-operatives and initiatives
  - Farmer unions
  - Dairies co-operatives
  - Feed stuff co-operatives
  - Extension service (supported by government until 1990)
  - Breeding co-operative and milk recording co-operative
  - Eradication of cattle diseases
  - Education since 1890 (supported by government)

- Farmer financed innovation, development and research (levy on milk, 13 yen and levy on meat, 434 yen)
AN OLD BUT STILL INNOVATIVE CLUSTER

- Democratic system and easy to get influence
  - Meetings
  - Demonstrations
  - Datacollection
- Sharing of knowledge
- Sharing of data from the farm – both efficiency and economic data
- Push from colleges
- Learning from the best
## STRATEGIC GOALS FOR DAIRY & CATTLE

<table>
<thead>
<tr>
<th></th>
<th>Goals 2018</th>
<th>Status</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk Yield</td>
<td>11.000 kg ECM</td>
<td>10.463 kg ECM</td>
<td>✔</td>
</tr>
<tr>
<td>Energy</td>
<td>95</td>
<td>96 (from KPO)</td>
<td>✔</td>
</tr>
<tr>
<td>Replacement percent</td>
<td>32</td>
<td>40,4</td>
<td>✗</td>
</tr>
<tr>
<td>Net add. gain vealcalves</td>
<td>700</td>
<td>619</td>
<td>✗</td>
</tr>
<tr>
<td>Slaughter calves in DK</td>
<td>298.000</td>
<td>229.957</td>
<td>✗</td>
</tr>
<tr>
<td>Antibiotics consumption</td>
<td>10.256 kg active sub.</td>
<td>13.141 kg active sub.</td>
<td>✗</td>
</tr>
<tr>
<td>Cell count</td>
<td>180.000</td>
<td>200.600</td>
<td>✔</td>
</tr>
<tr>
<td>Cow mortality</td>
<td>3,5</td>
<td>5,1</td>
<td>✗</td>
</tr>
<tr>
<td>Calf mortality</td>
<td>5,5</td>
<td>8,1</td>
<td>✗</td>
</tr>
<tr>
<td>Export of young calves</td>
<td>20.000</td>
<td>33.526</td>
<td>✔</td>
</tr>
</tbody>
</table>
DK 4.7 billion kg
33% of the milk
3023 Danish owners

92 mio. kg
Organic
75 owners

Owners

Revenue

Milk volume

Development in owners -5.7%
DANISH DAIRY FARMERS AMONG THE MOST EFFICIENT IN THE WORLD

Milk yield per cow (kg ECM/yearcow)
Sustainable dairy farming
DANISH DAIRY CONCEPT

An efficient system with high production and sustainability

Meat
Milk
Roughage
Slurry
Biogas
TECHNOLOGY SUPERVISES THE PRODUCTION AND THE HERD

- Activity
- Feed intake
- Milking

Registrations become useful information
DAIRY MANAGEMENT SYSTEM – A WEB-BASED PLATFORM FOR COOPERATION
THE CENTRAL DANISH CATTLE DATABASE

BIG DATA: The Danish Cattle Database system

DENMARK
- 577,000 dairy cows
- 3,210 dairy farmers
- 9,961 avg. kg milk per cow per year

MAIN DATA SOURCES
- Animal registration
- Dairies
- Slaughterhouses
- Laboratories
- Milking and feeding equipment

USERS
- 1,500 daily users
- 3,100 weekly users
- 110 advisors
- 230 veterinarians
- 150 AI assistants
WHAT IS DMS?

- System for registration
- Daily management
- KPI’s for keeping the production on track
- Benchmarking system
- Production analysis
- Feeding management
- Budget planning
- Follow up on budget
- Data integration to extern data sources
WHY DMS – OR SIMILAR SYSTEMS?

- Optimization of the *single cow* performance
  - Reproduction
  - Yield
  - Health
- Optimization of the *herd*
  - Performance
  - Find the spots to improve
  - Feeding
- Plan the production – optimize usage of capacities
- Follow up on the production
DMS PART OF THE DISEASE CONTROL IN DENMARK

- Control
  - Veterinary alert systems
- Eradication
  - Preferably by non-vaccination strategy
- Surveillance
  - To detect possible cases
  - To document freedom of disease
- Regular test made from
  - Bulk Milk
  - Slaughtered animals
  - Milk recording (PCR)

SEGES administrates all clarifications of suspected herds
Registration from cows

Data sources in the Danish Cattle Database

Use of data in daily management

Dairy Management System including:
- Feed ration plan incl. Norfor
- Forecast of the production
- Budget
- Follow-up on feeding
- Follow-up on budget
- Key Performance Indicators

- Milk production
  - Milk quality and quantity 95% of dairy cows

- Feed intake
  - Weighing feedstuff 60% of dairy cows

- Health registration
  - Disease and medicine 90% of dairy cows

- Claw registration
  - Claw stemming and claw disease 40% of dairy cows

- Reproduction
  - Insemination
  - Pregnancy 95% of dairy cows

- Calving
  - Calving rate
  - Calf condition 90% of all cows

- Advisors
  - 90% of herds

- Milking equipment
  - 20% of herds

- New Feeding equipment
  - 2% of herds

- Veterinarians
  - 90% of dairy herds

- Laboratories
  - 90% of dairy herds

- Slaughterhouses
  - 30% of all herds

- Dairies
  - 110% of dairy herds

- Hoof Trimmers
  - 40% of herds

- AI Technicians
  - 90% of herds
## Key Performance Indicators

<table>
<thead>
<tr>
<th>Topic</th>
<th>Status</th>
<th>Key figure (unit)</th>
<th>Achieved</th>
<th>Alarm limit</th>
<th>Reporting period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>✔️</td>
<td>ECM delivered (kg/day)</td>
<td>11,713</td>
<td>Min 10,942</td>
<td>Latest measurement</td>
</tr>
<tr>
<td></td>
<td>✔️</td>
<td>Milk delivered (kg/day)</td>
<td>11,131</td>
<td>Min 10,597</td>
<td>Latest delivery</td>
</tr>
<tr>
<td></td>
<td>✔️</td>
<td>Milk yield per lactating cows (kg ECM/day)</td>
<td>37.1</td>
<td>Min 35.1</td>
<td>Latest measurement</td>
</tr>
<tr>
<td></td>
<td>✔️</td>
<td>Milk quality (numbers of deductions)</td>
<td>1</td>
<td></td>
<td>Last 7 days</td>
</tr>
<tr>
<td>Reproduction</td>
<td>✔️</td>
<td>Inseminations of cows (numbers)</td>
<td>14</td>
<td>Min 4</td>
<td>Last 7 days</td>
</tr>
<tr>
<td></td>
<td>✔️</td>
<td>Inseminations of heifers (numbers)</td>
<td>1</td>
<td>Min 2</td>
<td>Last 7 days</td>
</tr>
<tr>
<td></td>
<td>✔️</td>
<td>Not pregnancy examined cows (numbers)</td>
<td>0</td>
<td>Max 0</td>
<td>Last day</td>
</tr>
<tr>
<td></td>
<td>✔️</td>
<td>Not pregnancy examined heifers (numbers)</td>
<td>0</td>
<td>Max 0</td>
<td>Last day</td>
</tr>
<tr>
<td>Health</td>
<td>✔️</td>
<td>Disease treatment, cows (numbers)</td>
<td>5</td>
<td>Max 5</td>
<td>Last 7 days</td>
</tr>
<tr>
<td></td>
<td>✔️</td>
<td>New infection, lactations (%)</td>
<td>6</td>
<td>Max 10</td>
<td>Last milk recording</td>
</tr>
<tr>
<td></td>
<td>✔️</td>
<td>New infection, dry period (%)</td>
<td>24</td>
<td>Max 18</td>
<td>Last milk recording</td>
</tr>
<tr>
<td></td>
<td>✔️</td>
<td>Over conditioned dry cows (%)</td>
<td>0</td>
<td>Max 20</td>
<td>Latest evaluation of condition</td>
</tr>
<tr>
<td></td>
<td>✔️</td>
<td>Dead animals (numbers)</td>
<td>0</td>
<td>Max 0</td>
<td>Last 7 days</td>
</tr>
<tr>
<td>Feeding</td>
<td>✔️</td>
<td>Energy efficiency (%)</td>
<td>103</td>
<td>Min 93</td>
<td>Last feed control</td>
</tr>
<tr>
<td></td>
<td>✔️</td>
<td>Milk minus feed cost (kr/kg ECM)</td>
<td>1.15</td>
<td>Min 1.20</td>
<td>Last feed control</td>
</tr>
</tbody>
</table>
BENCHMARKING

- Possibility to benchmark against similar groups of milk producers
- More than 70 different key performance indications available to choose from.

Benchmarking

<table>
<thead>
<tr>
<th>Status</th>
<th>Key figure (unit)</th>
<th>Value</th>
<th>Ref</th>
<th>Goal</th>
<th>Compared to group</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk yield (kg ECM/year)</td>
<td>11.454</td>
<td>10.870</td>
<td>11.400</td>
<td></td>
<td></td>
<td>12 / 355</td>
</tr>
<tr>
<td>Daily yield per cow (kg ECM)</td>
<td>31.4</td>
<td>29.8</td>
<td></td>
<td></td>
<td></td>
<td>12 / 355</td>
</tr>
<tr>
<td>Reproduction efficiency, cows (%)</td>
<td>0.30</td>
<td>0.32</td>
<td>0.34</td>
<td></td>
<td></td>
<td>19 / 359</td>
</tr>
<tr>
<td>Age at first calving (months)</td>
<td>23.8</td>
<td>23.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TOP MANAGEMENT IN THE FEED CHAIN

Growing Varieties → Prognosis → Harvesting → Compaction Coverage → Ration optimization Analyses → Mixing procedure → Feed bunk management → Feeding groups → Milk yield and quality
TYPICAL ROUGHAGE USED IN DANISH DAIRY

Maize
- Ambition (from Limagrain)
- Emblem (from Limagrain)
- Atrium (from Limagrain)

Typical yield: 13,000 kg dry matter per hectare

Grass
- Mixture 45
  - White clover
  - Red clover
  - Perennial ryegrass
  - Festuclolium
- Mixture 35
  - White clover
  - Perennial ryegrass

Typical yield: 12,000 kg dry matter per hectare
# Typical Feed Ration for 11.500 Kg ECM

<table>
<thead>
<tr>
<th>Feedstuff</th>
<th>Kg dry matter pr. cow pr. day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barley or wheat</td>
<td>4,0</td>
</tr>
<tr>
<td>Rape seed meal or expeller</td>
<td>3,0</td>
</tr>
<tr>
<td>Soya bean decorticated, extracted</td>
<td>1,0</td>
</tr>
<tr>
<td>Compound feed</td>
<td>2,0</td>
</tr>
<tr>
<td>Clover grass silage</td>
<td>5,5</td>
</tr>
<tr>
<td>Maize silage</td>
<td>8,4</td>
</tr>
<tr>
<td>Minerals and salt</td>
<td>0,2</td>
</tr>
</tbody>
</table>

Other feedstuffs commonly used: Straw, Dried beet pulp, Saturated fat
# TYPICAL FEED RATION FOR 11.500 KG ECM

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>In feed ration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry matter intake, kg DM/day</td>
<td>24.0</td>
</tr>
<tr>
<td>Net energy lactation, MJ/day</td>
<td>159</td>
</tr>
<tr>
<td>AAT to energy ratio, g/MJ</td>
<td>15.8</td>
</tr>
<tr>
<td>Protein balance in rumen, g/kg DM</td>
<td>11</td>
</tr>
<tr>
<td>Protein, g/kg DM</td>
<td>165</td>
</tr>
<tr>
<td>Fatty acids, g/kg DM</td>
<td>30</td>
</tr>
<tr>
<td>NDF, g/kg DM</td>
<td>315</td>
</tr>
<tr>
<td>Starch, g/kg DM</td>
<td>230</td>
</tr>
</tbody>
</table>
COMPACT TMR PROVIDES HIGHER PERFORMANCE AND BETTER HEALTH

Traditional TMR

- Sorting and competition between cows
- Spends a lot of time at the feed bunk
- Feedstuffs are visible
- Feed intake varies

Compact TMR

- No sorting and competition
- Cows are eating from the top of the pile
- Feedstuffs have ”disappeared”
- Adhering and moist mix
- Homogenous and short structure
SEGES Dairy & Beef Research Centre

MANAGEMENT AND LEADERSHIP
MAJOR TRENDS IN THE TECHNOLOGICAL DEVELOPMENT IN DENMARK

This means high demands for:

- Farmer education
- Training in new technology
- Use of data and computer as a tool for the daily operational tasks
- Skilled employees
- Management and leadership skills
THE ROLE OF THE FARMER HAS CHANGED

From skilled craftsman
- Doing all the farm work
  - Milking
  - Feeding
  - Field work
  - Monitoring the herd

To farm manager and leader
- Formulation of strategy
  - Management” of consultants
  - Management of labor
  - Management of production and economy
  - Monitoring the herd by use of technology
MANAGEMENT TOOLS

- Managerial coaching; ex. advisory boards, mentor
- Tools ex. SOP, LEAN, Change Management
- Employee meetings ex. week planner, improvement/idea generation
- Management implementation
SOP’S

EIGHT SOP-subjects

1. Calf care (26 A4 pages)
2. Calving, (11 A4 pages)
3. Drying off, (6 A4 pages)
4. Reproduction, (4 A4 pages)
5. Feeding, (10 A4 pages)
6. Milking (16 A4 pages)
7. Biosecurity (15 A4 pages)
8. Claws (17 A4 pages)
EFFECTS WITH SOP

- Less telephone calls
- 2-3 month faster start-up labour
- Less sick animals (ex diarrhea)
- More uniform solved task
- Better reproduction (more inseminations)
- Saves 4-5 animals from dying every year
- Earned home in a week!

- And is helping dyslexics employees
WEEKLY WHITE BOARD MEETINGS – HOW TO MOTIVATE AND DELEGATE WORK
Week planner

Improvement

- Stra i hulen, 3 gang ugeledig
- Forsøg på at vokse
- Indsæt pølse
- Tjek, om din gut kan

Forbedringsforslag

- Mål: Lævenderote VALVE
- 10 x 0,50 klippet - godt sanderejede
- Selv om skilt til goldcer

Prioritering

- EFFEK T
- Snart
- TAG A HVORNE

- TAG B HVORNE
- Spring over
EFFECTS OF BOARD MEETINGS

Whiteboard meetings
- Involve the employees
- Visible goals and results
- Culture improvement
- Noticeable management
- Team spirit
KEY PERFORMANCE INDICATORS

● GOALS
  ● Milk yield
  ● Cell count
  ● Mastitis
  ● Dead animals
  ● Treatments of calves
  ● Broken things

● Indicators to reach the goal
SEGES Dairy & Beef Research Centre

MILK QUALITY
FARMERS ARE FOOD PRODUCERS
Today SEGES handles all milk quality advisory for Danish farmers

- Strong results and significant improvement on all relevant quality parameters
- The SEGES position as Dairy research and knowledge center gives unique access to specialists and the newest information within the industry
- International experience with milk quality advisory tasks from countries like Sweden, Germany, Russia, China, Island, Tunisia
- Independent, but strong collaboration with all milking equipment producers, which gives access to new information and knowledge
- SEGES is ISO 9001:2015 certified
MILK QUALITY ORGANIZATION

- Central set-up from SEGES
- Team of 12 technical advisers
  - Farm visits
  - Quality programme inspectors
  - Phone consultations
- Specialists – consultancy service
WHAT DO SEGES ACTUALLY DO WITHIN MILK QUALITY?

- In Denmark we handle all milk quality related issues at the dairy farms.
  - Monitoring of milk quality parameters: bacterial count, somatic cell count, spores, freezing point, microbiological inhibitors, traces of antibiotics etc.
  - Specialist advices on udder health and hygiene
  - Training of farm personnel: good milking practice in hygiene, milking technique, cleaning and maintenance of equipment
  - Technical testing of milking machines
  - Practical milking (milking instructions)
  - Dynamic machine testing during milking
  - Design of milking system
- Trouble shooting, supervision, phone consultations and farm visits
OUR RESULTS – EXAMPLE SOMATIC CELL COUNT DENMARK

Somatic cell count - geometric

- Geometric
MILK QUALITY

● On farm quality control program
  ● Individual cow milk samples
  ● Bulk tank samples
● Quality control at delivery to dairy
● PCR technique for mastitis
● Regular quality analysis at a certified laboratory
  ● An efficient surveillance system
  ● For example surveillance of diseases
    ● Denmark is free from following diseases
    ● Foot- and mouth disease
    ● Brucellose
    ● IBR
    ● BVD
    ● Leucose
● An effective up to-date advisory system
● Monitoring management level on farms via DMS/Cow database
SEGES OFFERS A VARIETY OF PRODUCTS AND KNOWLEDGE TO BE USED WORLD WIDE

SKIM THE CREAM OF OUR UNIQUE CATTLE KNOWLEDGE
Healthy milk from healthy cows

Thank you for your attention!