New on-farm technologies in dairy herd improvement (DHI) and farm management

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Kees de Koning*, Bert Ipema,
Pieter Hogewerf, Peter Huijsmans

* ICAR Test Centre - NL
New on-farm technologies & milk recording

- Developments in farming
- Use of technology on dairy farms
- Milk Recording and ICAR
- ICAR Guide Lines
Developments in machine milking
Milking parlour or AMS?

Every 5 out of 10 NL farmers choose AMS.
Manufacturers
Management Aspects AMS

- Increase in milk yield limited, however large variations among farms
- More and more statistical tools (data mining)
- Individual response of animals
- Optimizing individual milking criteria and feed input
- Sensor technology
  - Hugh amount of data
  - Management by exception
New Technologies and Milk Recording

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- Take Home Message
Current technologies on dairy farms

- Utilization of electronic devices and systems
  - ID, concentrate feeders
  - yield sensors, pedometers, conductivity
- Automatic Milking Systems growing fast
- More and more integrated systems on farm
  - (ID, Yield, Data collection, sampling)
- Development of Genomics
- Strong growth of external data services
- In-line sensors and on-farm analyzers are entering market
Feed intake ok?

In heat?

Enough milk?

Mastitis?

Lameness?

Feed intake ok?
## Sensors in dairy production

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Indications</th>
<th>Management</th>
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<tbody>
<tr>
<td>Hormones</td>
<td>Heat</td>
<td>Reproduction</td>
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<tr>
<td>Urea</td>
<td>Ketosis</td>
<td>Feeding</td>
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<tr>
<td>Proteins</td>
<td>Inflammation</td>
<td>Health</td>
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<tr>
<td>Pathogens</td>
<td>Mastitis/diseases</td>
<td>Health / Product</td>
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<tr>
<td>Conductivity</td>
<td>Mastitis</td>
<td>Health</td>
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<tr>
<td>Residues</td>
<td>Milk quality</td>
<td>Product quality</td>
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<tr>
<td>Yield, fat and protein</td>
<td>Feed quality</td>
<td>Feeding</td>
</tr>
<tr>
<td>Body score</td>
<td>Condition</td>
<td>Feeding</td>
</tr>
<tr>
<td>Locomotion score</td>
<td>Claw health</td>
<td>Health</td>
</tr>
<tr>
<td>Location (gps)</td>
<td>Diseases, welfare</td>
<td>Health</td>
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Information is the key element

FROM MEASUREMENT TO KNOWLEDGE

Information on:

- Herd management
  - Milk recording, data services
  - Feeding management
  - Health management

- Farm, technical and financial management

- Support for governance, administration but also certification systems (quality assurance -chain)

- Sustainability programs dairy industry
“We are drowning in data but starving for information”

John Naisbett
From Data to Result

RESULT

ACTION

KNOWLEDGE

INFORMATION

DATA

OBJECTIVES

Decision/Execution

Analysis

Integration

Collection

Benefit

Cost
Sensor technologies

Analysis @ the point of animal care
Milk meters & samplers (see www.icar.org)
External analysis
Milk components on-farm
Milk components in-line
Herd Navigator: Progesteron, LDH, BHB

<table>
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<tr>
<th>Focus area</th>
<th>Parameter analysed in milk</th>
<th>Early/on time detection</th>
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<tbody>
<tr>
<td>Reproduction</td>
<td>Progesterone</td>
<td>Heat, Silent heat, Pregnancy, Abortion, Cysts, Anoestrus</td>
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<tr>
<td>Udder health</td>
<td>LDH – lactate dehydrogenase</td>
<td>Mastitis, Subclinical mastitis</td>
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<tr>
<td>Feeding and energy balance</td>
<td>Urea, BHB – beta hydroxybutyrate</td>
<td>Feed ration – protein, Ketosis, Subclinical ketosis, Secondary metabolic disorders</td>
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</table>

**Reproduction status – progesterone profile chart**

- **Heat**
- **Heat/Insemination**

- **Heat cycle**
- **Luteal cyst**
- **Lollicle cyst**
- **Pregnancy**
Afilab: Milk composition in-line
New Technologies and Milk Recording

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Animal production future challenges

- **Need:**
  - Improvement of production and product quality
  - Lowering cost price

- **Tools:**
  - Early warning systems for management and quality programs
  - Sensors & Internet applications

- **Possibilities:**
  - Measurements at animal level
  - Day to day management & genetic data

- **Key success factors:**
  - Robust and profitable systems, fitting in the management of the farmer
Modern milk recording herds

- Cow ID, electronic milk meters, samplers, computer systems, Internet Access
- Need for information on SCC, urea, fat, protein, lactose, progesteron,
- Day to day management
- External analysis samples in well organized laboratories
- In-line and on-farm sensor developments
  - Threat or Opportunity?
- Time gain, quality of data versus costs
- New services
Milk Recording

- Genetic improvement
- Benefits not only from genetic improvement, also
  - Feeding
  - Daily herd management
  - Disease control
- ICAR current focus on device accuracy levels
  - Approval procedures,
  - Device requirements
  - Routine test procedures
Milk Recording Future

- More towards integrated systems
  - New devices like in-line meters,
  - Test procedures,
  - Continuous monitoring
  - Quality Assurance
- Generic sampling systems for on-farm use
- Samples for disease control, DNA testing
- Issues like carry-over more important
- Sub Committee Recording Devices has several AT
  - Continuous monitoring, generic samplers
  - Carry over
ICAR Guide Lines milk analysers

- Laboratory equipment
  - Milk analyzers
- On-farm (at-line) analyzers
  - Milk analyzer on farm using a representative sample
- In-line analyzers
  - Mounted in the milking system
  - Real-time or at the end of milking on a representative sample of the whole milking
- Chapter 11 adapted for in-line analyzers
  - First system under test
Alternative routine testing methods

- Calibration, Routine testing and Maintenance
- Manual water tests very time consuming
- Use of smart statistical methods
- Use of milk meter data (milk meter, yield, cow number)
- Difference average per cluster number vs average all milkings on all clusters
- Several methods are possible
- Action team within Sub Committee Recording Devices
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Precision farming, the right answer!?

- Technology to save labour and costs
- Technology to improve
  - Management
  - Milking including milk recording
  - Feeding
  - Social life
- Past many technologies, few were really successful, we have to learn from the past
- Farmers will adapt new technologies, however..
Farmer has a choice!

Too complicated!

Very useful!

Too expensive!
Future milk recording: combining precision farming technologies and external services

Smart combination of tools, technologies and skills

- Measurement, interpretation, action of the farmer
- Integrated approach necessary

- Challenge is to analyse, to interpret data and to transfer into actions
- Helpful means to improve farming business
- New management services
- Industrial partners play important role
- Co-innovation is key for success
What else to expect in future?

- Ongoing technology development
  - Labour, animal care, dairy chain related
- New sensors
  - Food safety, composition,
  - Health and welfare status, antibiotic therapy,
  - Genomics, GHG
  - Basis milk, odeur, movement, blood
- On farm processing of milk components
- Measure locally, (data) analysis externally
- Data will be used within the Food Supply Chain
- Chances & opportunities
Thanks for your attention!

Kees.deKoning@wur.nl