New Technologies and their impact on Milk Recording

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New Technologies and Milk Recording

- Developments in smart farming
- Use of technology on dairy farms
- Milk Recording and ICAR
- ICAR Guide Lines Update

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Developments in the past decades (1950-2010)

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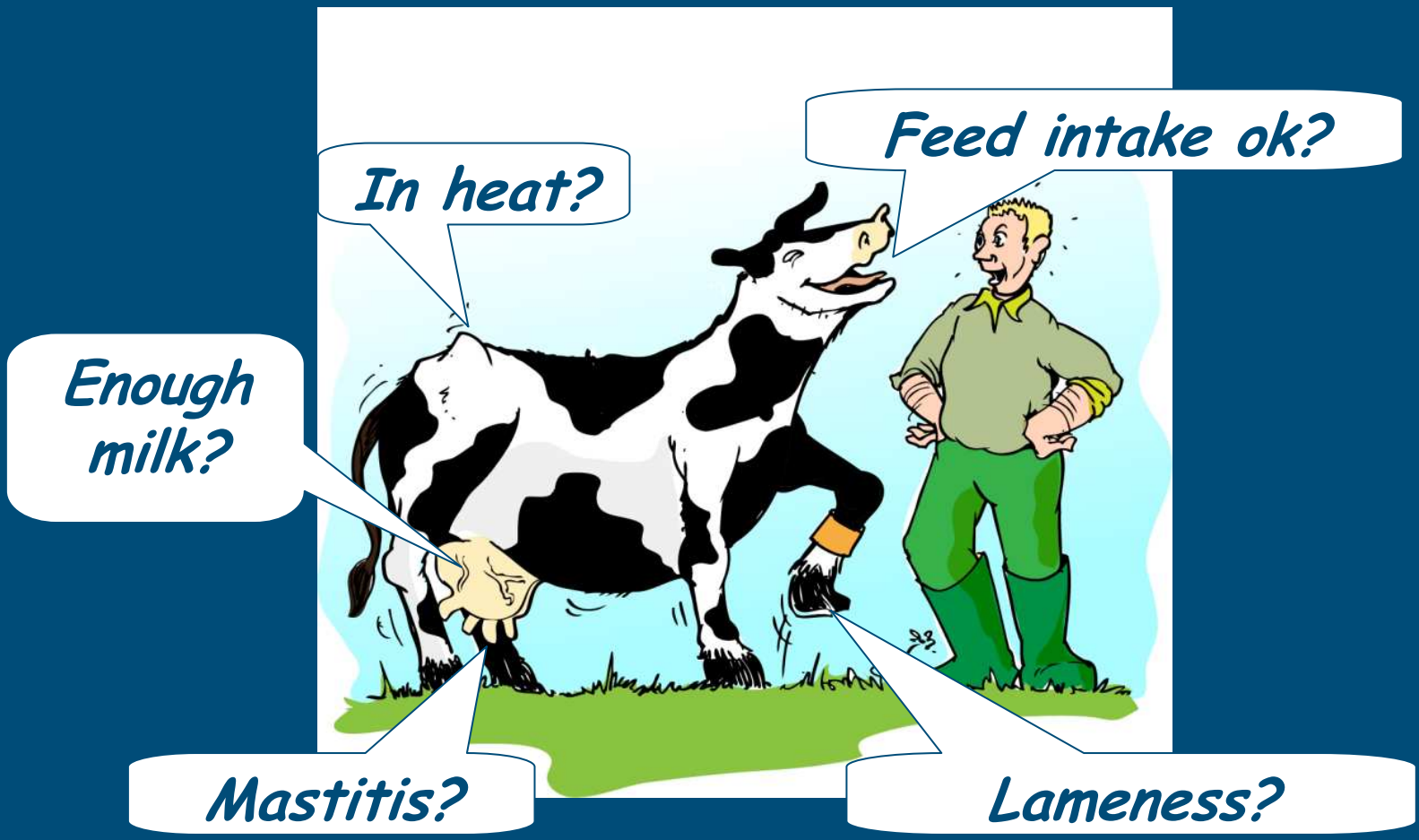
Smart farming? Individual approach in large herd…



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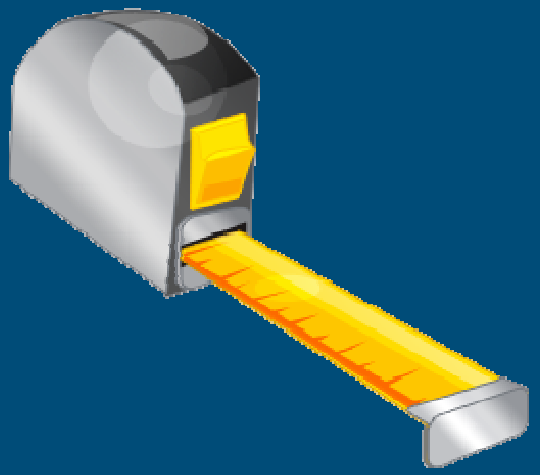
Information as a key element

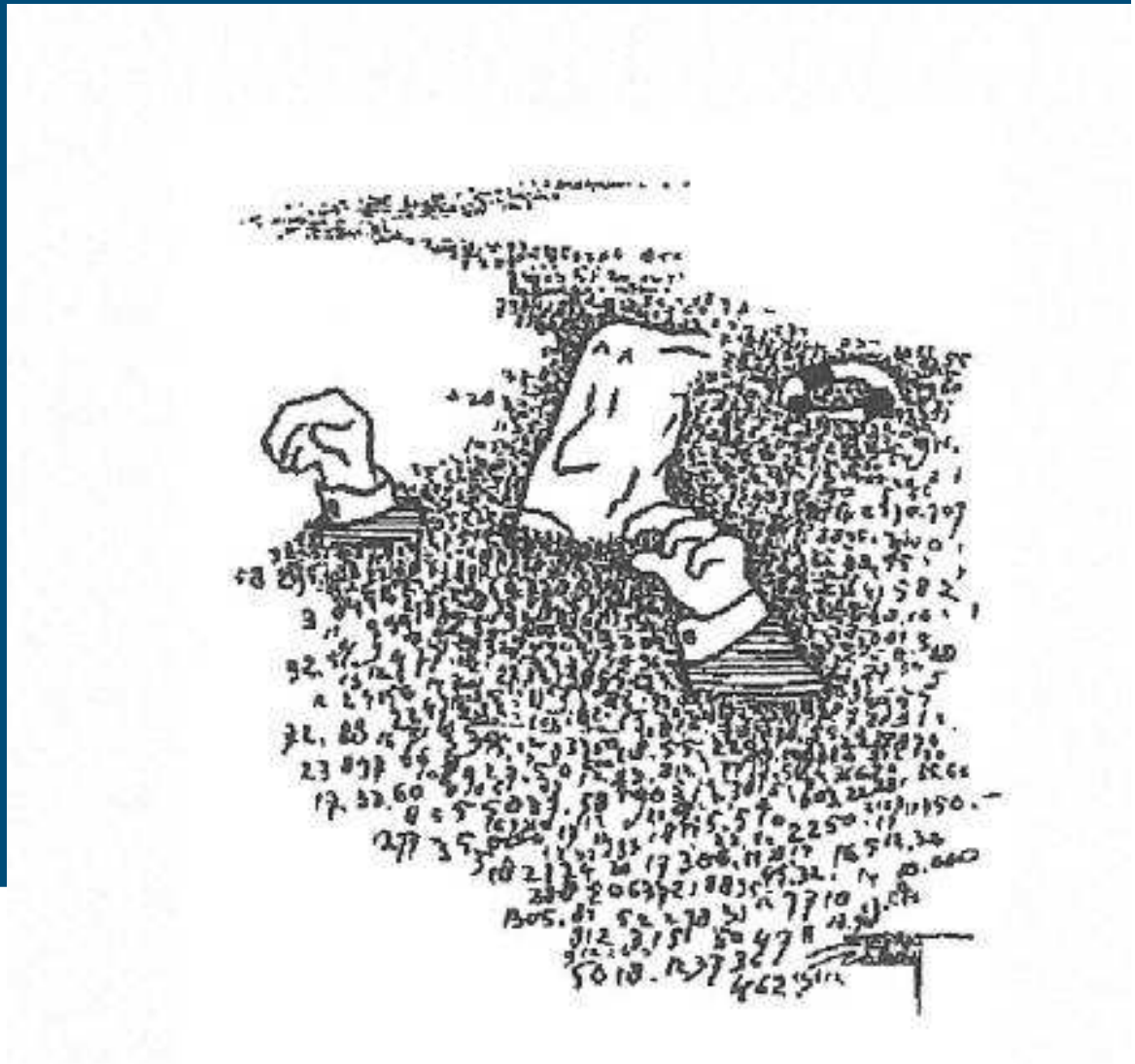
From Measurement to Knowledge



Information on:

- Herd management
  - Milk recording, data services
- Farm and financial Management
- Support for governance, administration but also certification systems (quality assurance)

“We are drowning in data but starving for information” John Naisbett



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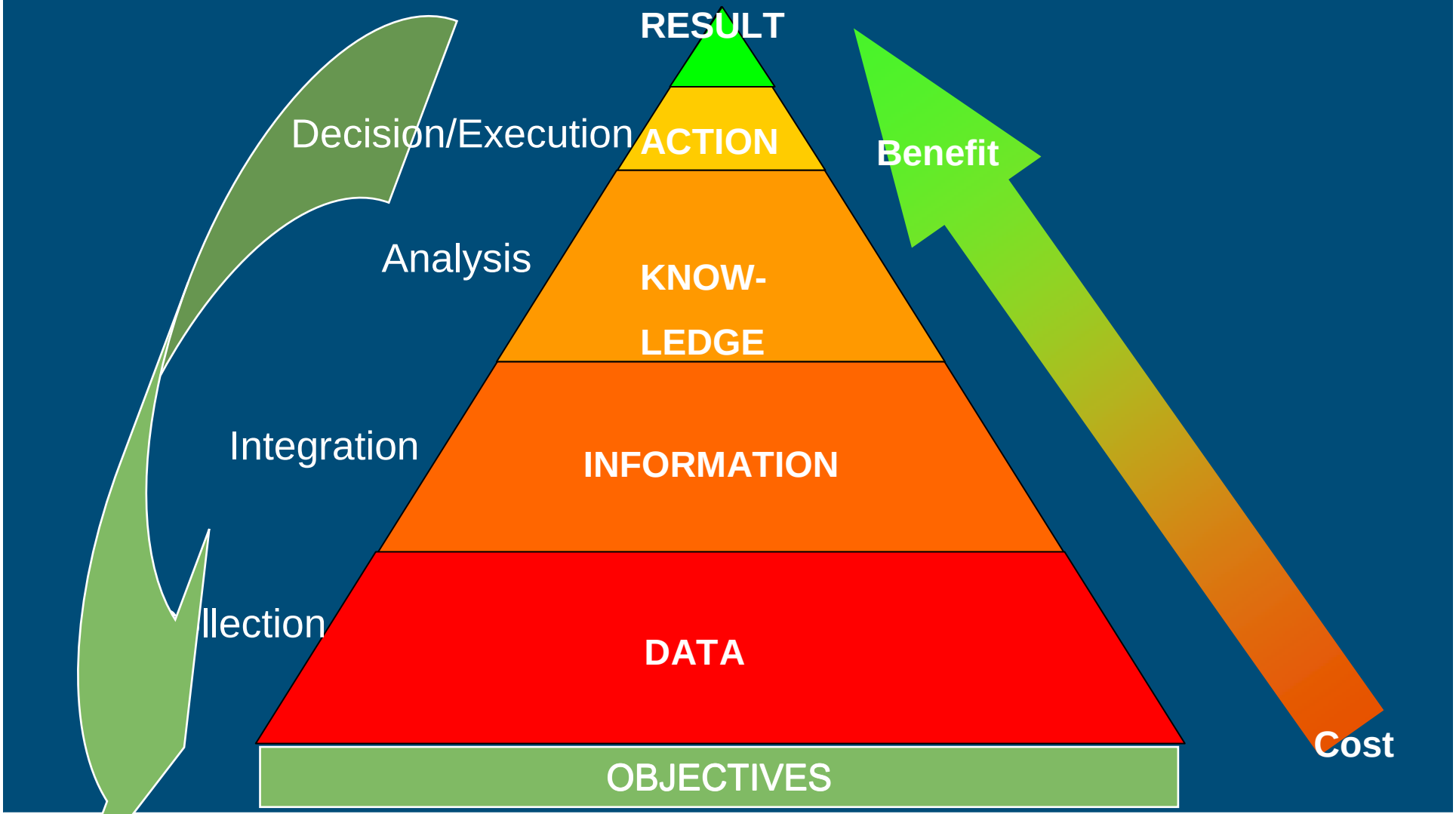
From Data to Result



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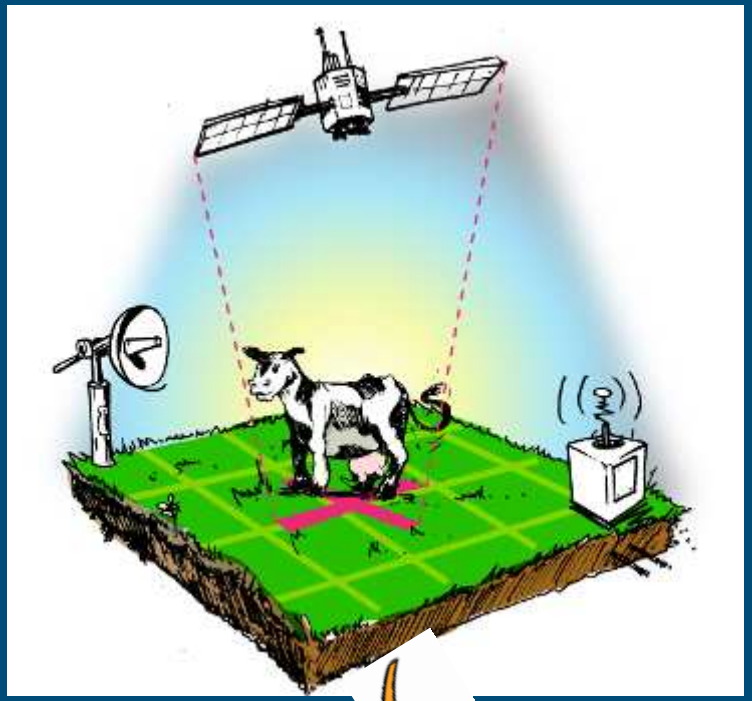
Smart dairy farming

Technological developments



Cow management

INTERACTION

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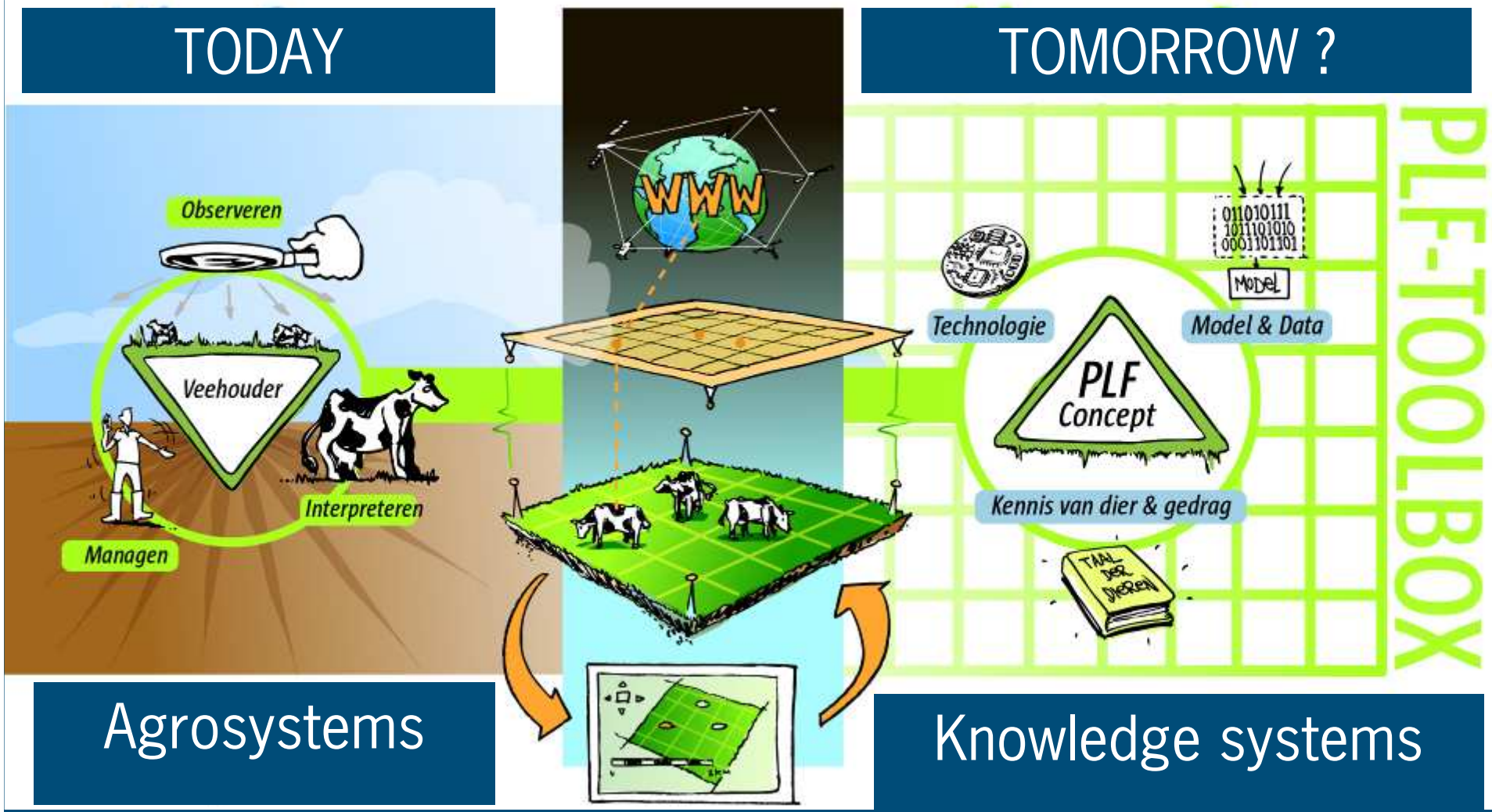

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Smart farming, the answer?

- Technology to save labour and costs
- Technology to improve
  - Management
  - Milking including milk recording
  - Feeding
  - Social life
- Past many technologies, few were really successful, what can we learn from past?

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Current technology on dairy farms

- Utilization of electronic devices and systems
  - ID, feeding concentrate, yield sensors, pedometers, conductivity
- Automatic Milking Systems growing fast
- More integrated systems on farm
  - (ID, Yield, Data collection, sampling)
- Need for extra information
- In-line sensors and on-farm analysers entering market

Sensor technology

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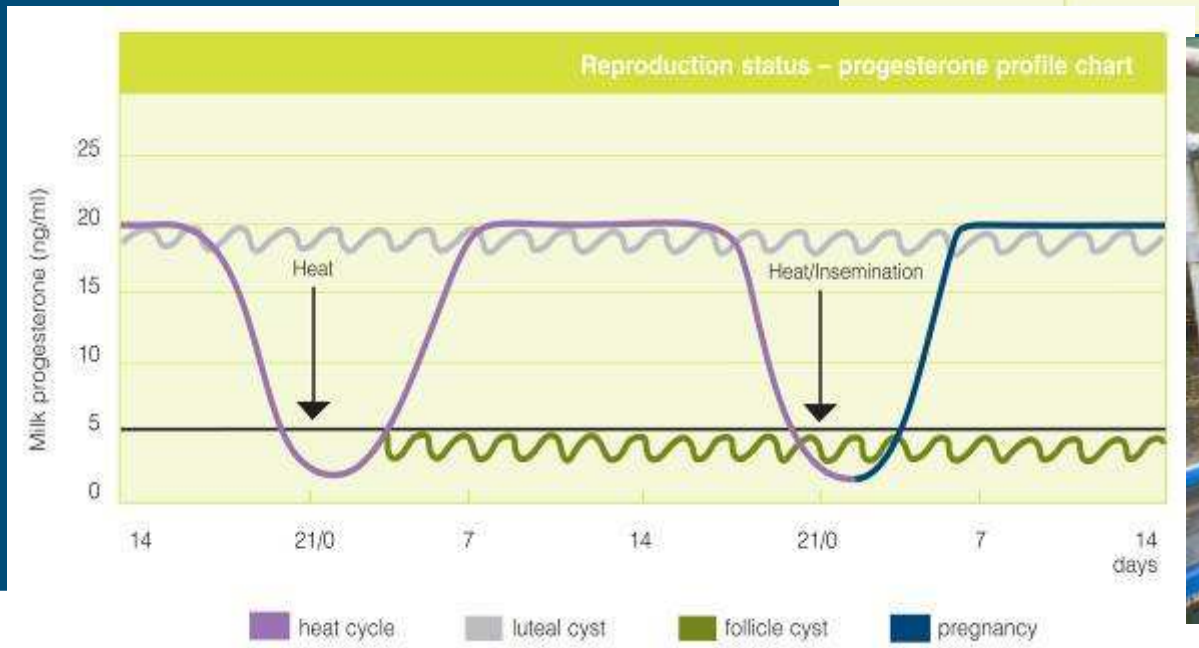
Milk components

Progesteron, LDH, BHB

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



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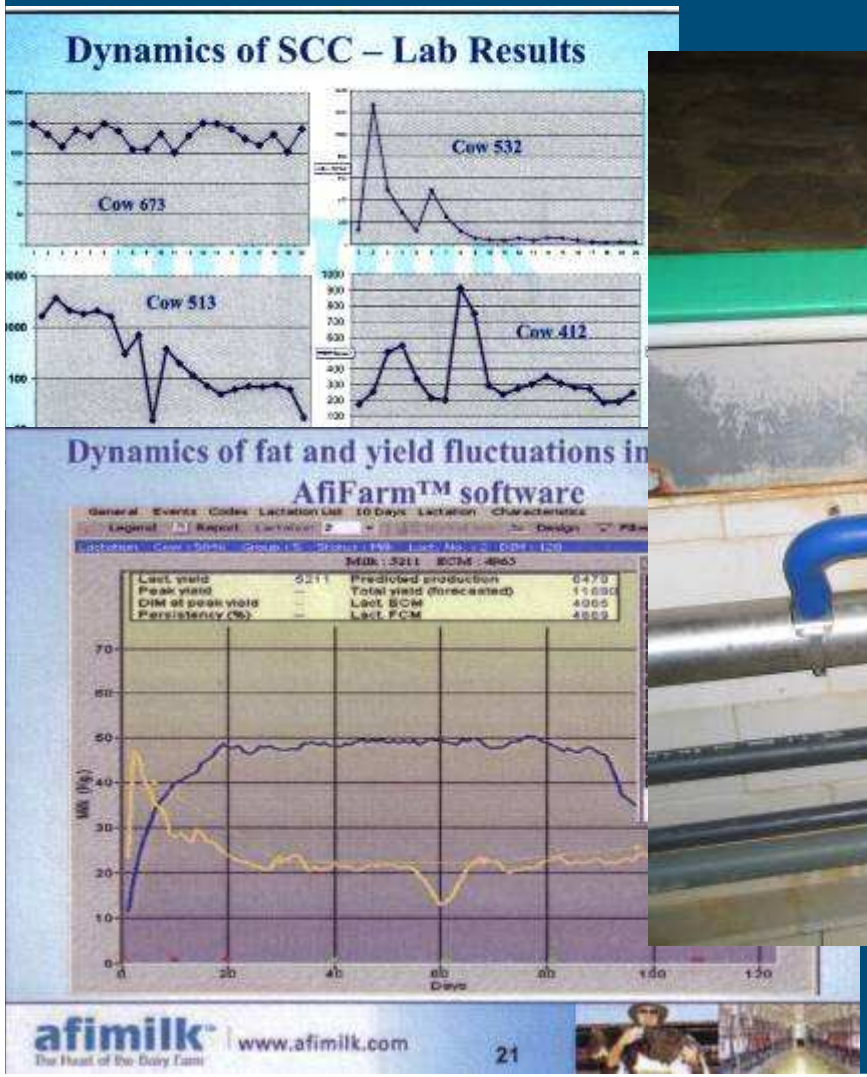
Milk composition in-line



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Drivers for sensor introduction

- Need for management by exception
- Strong focus on milk recording elements
- Development of Food Chain programs
  - ICT and communication
  - Product demands
- Introduction of highly automated milking systems
- External analysis or on farm analysis
- Time gain, quality of data versus costs
- Introduction of new statistical methods

What to expect in future?

- New sensors?
  - Food safety, composition, health and welfare status
- On farm processing of milk
  - Differentiation, use of colostrum, milk refinery,
  - Less transport volume: UF, RO and other techniques
- Measure locally, (data) analysis externally?
- Function within the Food Supply Chain?
- From grass to milk?
- New milk recording services
- Role of ICAR?

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ICAR Milk Recording

- Genetic improvement
- Benefits not only from genetic improvement, also
  - Feeding
  - Disease control
  - Daily herd management
- ICAR focus strongly on milk meter accuracy levels
  - Approval procedures, device requirements and routine test procedures
- More towards integrated systems
  - New devices, test procedures, continuous monitoring

Animal production future challenges

- Need:
  - Improvement of production and product quality
  - Lowering cost price
- Tools:
  - Early warning systems for management and quality programs
  - 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 dairy herds

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

MPR and utilization of milk recording (2008)

	CAN West	DK	FR	DE	NL
Farms	6418	4750	98000	103500	21173
% MPR	71.2	92.6	61.2	66.5	80.6
% EMM	11.3	17.9	1.8	6.5	24.7
% Cows in MPR	81.6	95.7	70.3	83.8	85.1

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Alternative routine testing methods

- 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
- $Deviation_{ms} \approx \mu_{ms} \times AvgKgMilk_{Mm}$
- $\mu_{ms} = 0$ when meter operates ok
- Applied in several countries

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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
  - Similar approach as for milk meters
  - Compulsory and non-compulsory elements
  - Limits of error are different
  - Test day approach

Milk Analyzer Limits (adapted from Olivier – 2008/2010)

Principle of establishing limits

- Accuracy must respond to the need of the milk producer for daily management to detect/measure significant production changes
- That means dealing with normal day to day variation
- Proposal limits for on farm devices

  (introduction equivalence factor FE)
  - Lab analyzers: FE = 1
  - On-farm analyzers: FE = 2
  - On-farm in-line FE = 2.5

Limits of error (Based on work by WP OMA (Olivier et al, 2010)

Table 11.2b. The accuracy limits for in-line milk analyzers in milk recording for fat and protein (compulsory elements for approval of milk analyzers)

Accuracy	range	standard deviation	bias
Fat	2.0-6.0 g/100g	0.25 g/100g	0.13 g/100g
	5.0-14.0 g/100g	0.25 g/100g	0.25 g/100g
Protein	2.5-4.5 g/100g	0.25 g/100g	0.13 g/100g
	4.0-./0 g/100g	0.25 g/100g	0.25 g/100g

Table 11.2c. The accuracy limits for in-line milk analyzers in milk recording for lactose, urea and SCC (non-compulsory elements for approval of milk analyzers)

Accuracy	range	standard deviation	bias
Lactose	4.0-5.5 g/100g	0.25 g/100g	0.13 g/100g
Urea	10 – 7- mg/100g	15.0 mg/100 g	3.0 mg/100 g
SCC	0-2000	25 %	13 %

Take Home Message

- Milk Recording scenery is changing
- Smart Farming / use of sensor technology
- Introduction on-farm / in-line milk analyzers
- Will affect milk recording services
- Not only threat, also opportunities for new services

Thanks for your attention

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