TINE RÅDGIVING

BOND STUDY TOUR NORWAY

April 9th to 13th 2018

Farm of the future - farming and livestock business is digitizing

Harald Volden
R&D TINE Advisory service

The cooperative – TINE's strong roots

- TINE's origin as a cooperative goes back to 1856, with the establishment of Rausjødalen Setermeieri
- In 1905, the farmers owned about 700 dairies
- In 1990, there were 18 cooperatives and 120 facilities
- In 2010 one cooperative society
- TINE has 95% of the raw milk market
- TINE has 80 of the product milk market.

TINE's value chain

Raw material supplier and owner

- More than 11 000 farmers deliver the raw material – milk - for TINE's many brands
- As supplier and owner of TINE, they are both the bedrock and final decision-makers

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Key figures of Norwegian dairy production

- 225.000 cows
- 9000 farms
- National breed. Norwegian Red (95 %)

- Milk yield. 8200 kg/h/yr
- Milk fat 4.25 %
- Milk protein 3.40 %

- Feeding
  - Forage: 57 % (grass silage)
  - Concentrate 43 %
  - Domestic feed proportion: 82 %

  - Ratio between feed:milk price = 0.45

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TINE advisory service - a part of TINE's value chain

Advisory unit

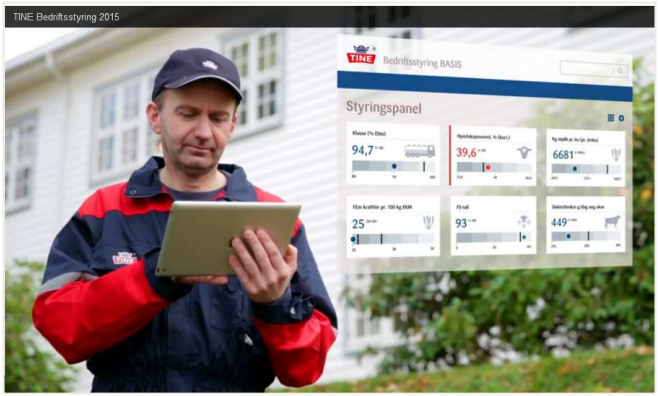
280 advisors located allover the country

Advisory activities in:

- Milk quality
- Feeding
- Health
- Animal welfare
- Economy
- Business counseling
- Technique (milk and building)
- Breeding

Research and development unit

- Scientific and technological
- Development of IT management tools



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Advisory activities in:

- Milk quality
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- Technique (milk and building)
- Breeding

On farm delivery in 2016:

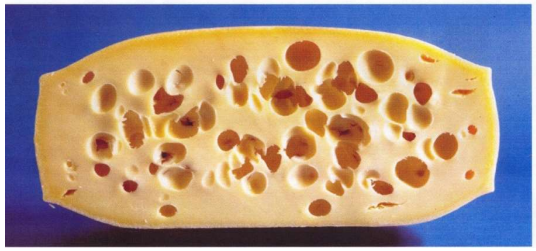
- 198.000 h except traveling time
- 23.2 h per farmer

Financial model:

43 % paid directly by the farmer

Why is milk quality important

- Product quality
- Production efficiency. At both farm and industry
- Animal health
- Reputation



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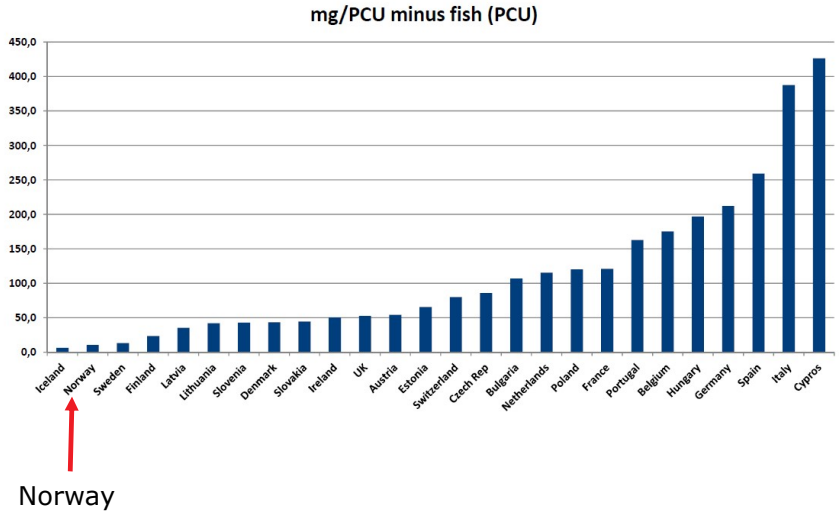
TINE advisory diagnostic laboratory for disease control and disease prevention

Milk and blood analysis

- Mastitis bacteria and antibiotic resistance
- Infective disease control

Use of antibiotics in European animal production

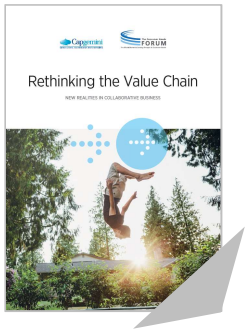


Norway

Consumers are gaining market power and use it to influence the behaviour of producers

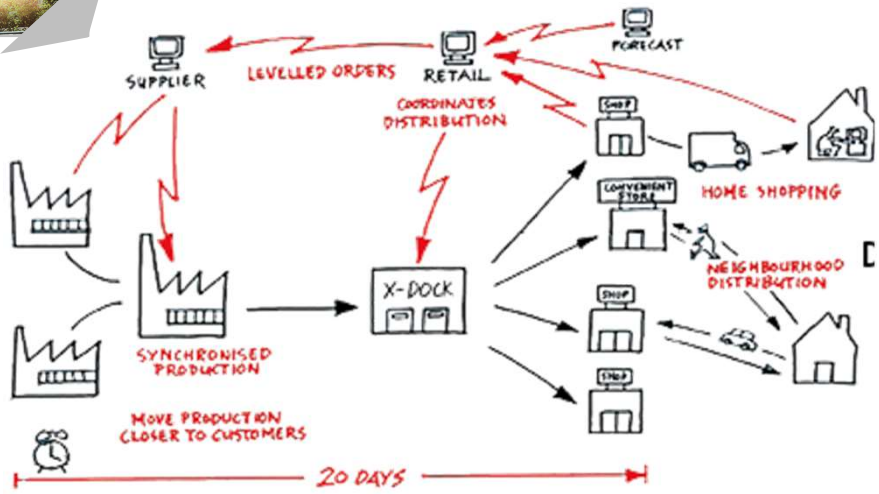
4

Market Trend: Demand for Transparency



Industry
Driven Networks

Consumer
Driven Value Networks

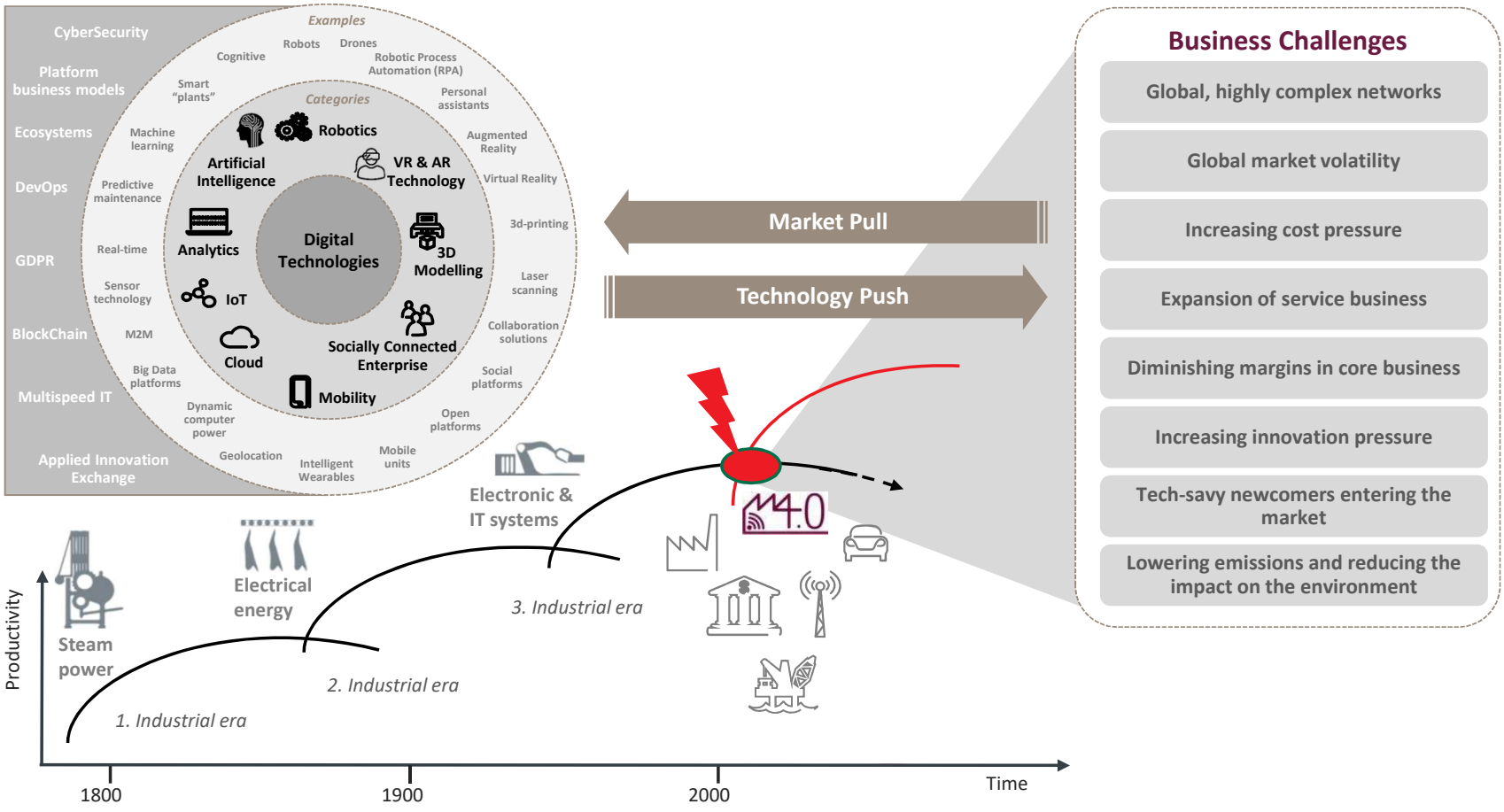


Industry in charge
Consumers respond

Consumers in charge
Industry respond

Sources: Capgemini publication on The Consumer Goods Forum

Today´s digital technologies will drive fundamental business changes which will create major opportunities for the right players



Business Challenges

- Global, highly complex networks
- Global market volatility
- Increasing cost pressure
- Expansion of service business
- Diminishing margins in core business
- Increasing innovation pressure
- Tech-savy newcomers entering the market
- Lowering emissions and reducing the impact on the environment

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Future challenges at the farm gate

Environment and nutrient losses, green house gasses, production efficiency, feed efficiency, animal health, animal welfare, milk composition for improved human health

Farm of the future: Farming and livestock business is digitizing – enhancing forecasts, automating production, maximizing yields and increasing health and welfare of livestock

Drone / Satellite Field Monitor

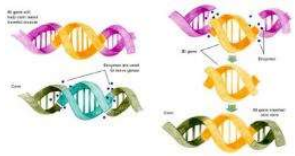
- Picture analysis from drone or satellite footages
- Information is fed into the Farm Management System

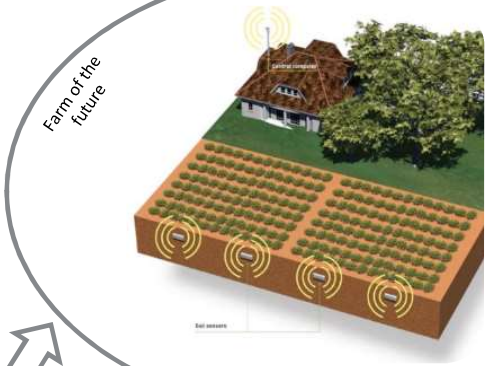
Integrated Farm Management

- All data is being gathered and analysed
- Internal data from sensors, etc. as well as external data like weather reports, news (Big Data)
- Alarms directly on Grower's mobile device with all required information
- Automated action initiation possible

Genetically optimized crops

- More yield shorter growth periods and higher resistance
- Specific features, like blossoming at a specific time





Automatic Precision Farm Machinery

- Farm machines without drivers, networked for maximized efficiency
- Cultivating, seeding, fertilizing, using pesticides automatically with absolute precision and minimal waste

Sensors in the field

- Measuring soil irrigation, fertilization, humidity

Real time management of livestock

- Sensors, trackers, GPS etc
- Automated herd and livestock by autonomous robots (milking, health, position etc)
- Increased animal welfare, sustainability and higher yields
- The economic model vs Animal model

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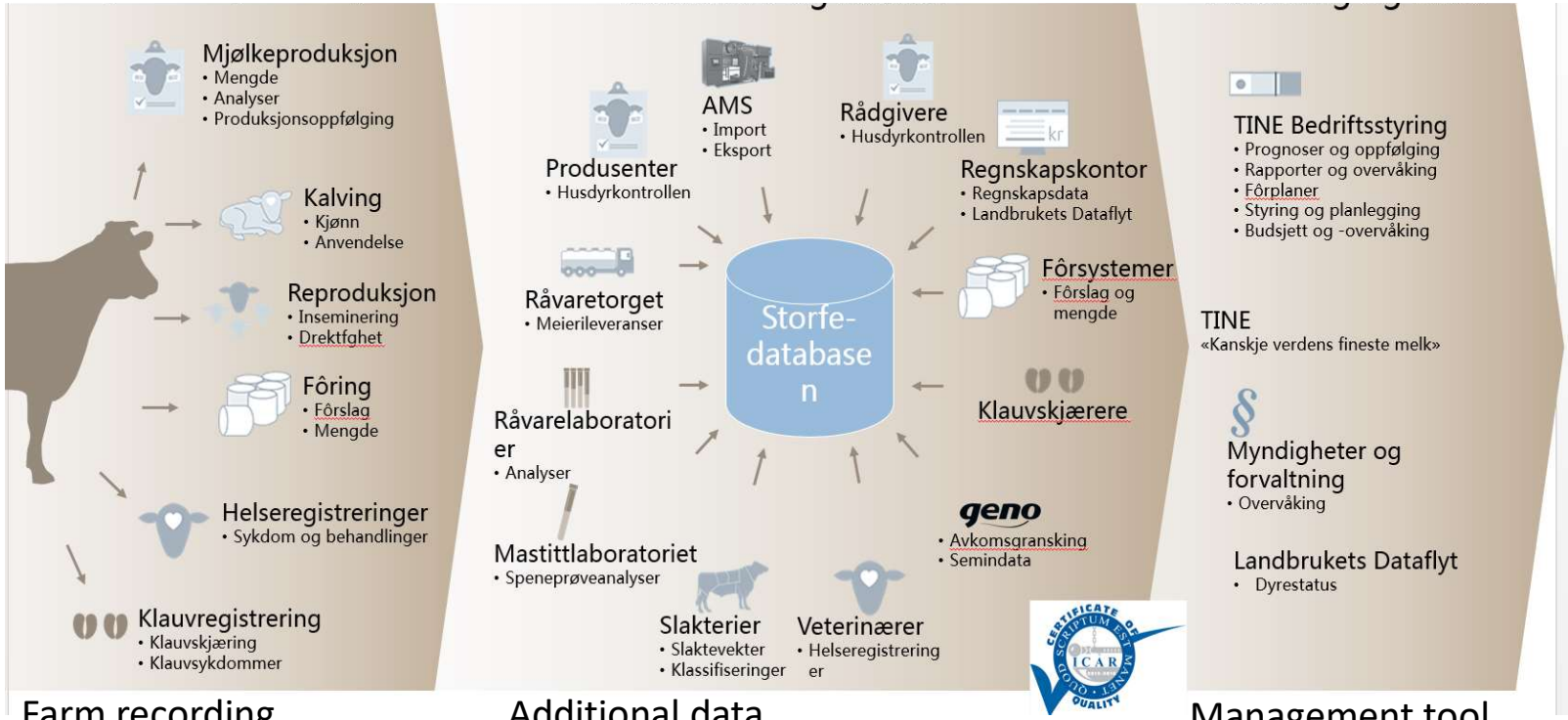
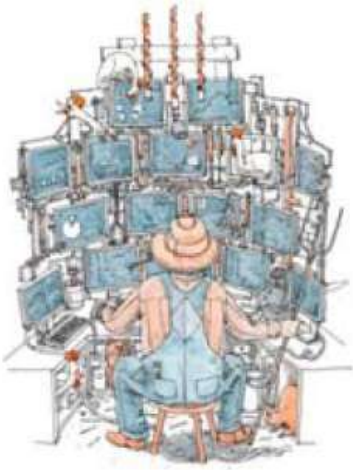
Data collection and efficient management tools

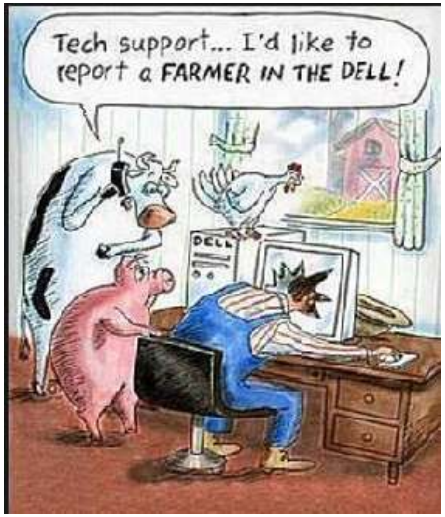


Farm recording system. Individual animal data

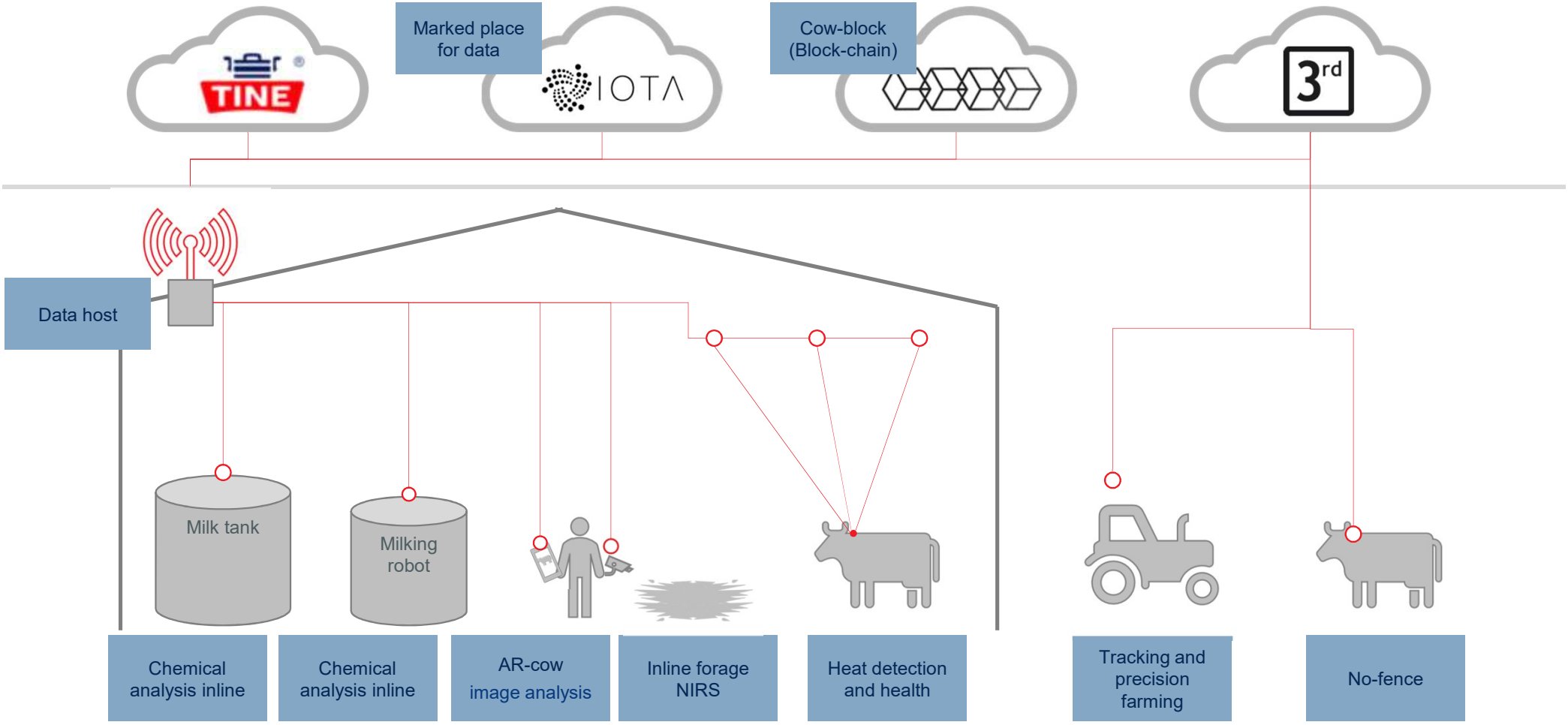
Additional data
Economy
Analysis
Genetics

Management tool





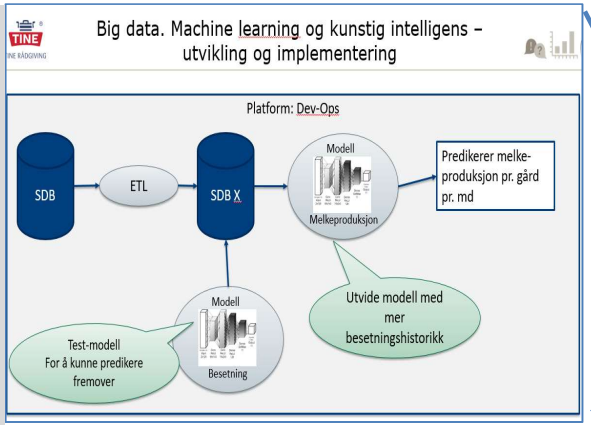
Technology under review and evaluation



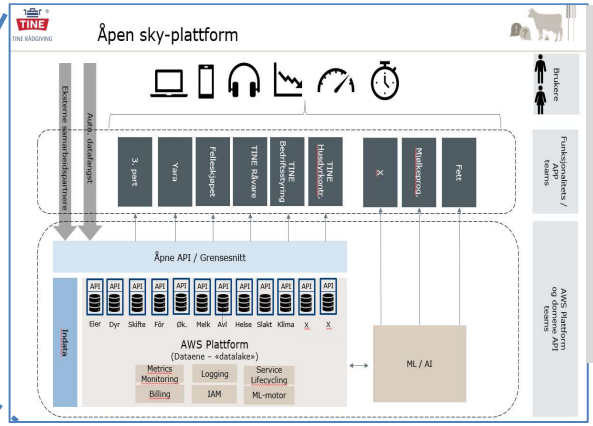
Technology and Digital Development

Analysis and models

- Machine learning
- Artificial intelligence



Future farm

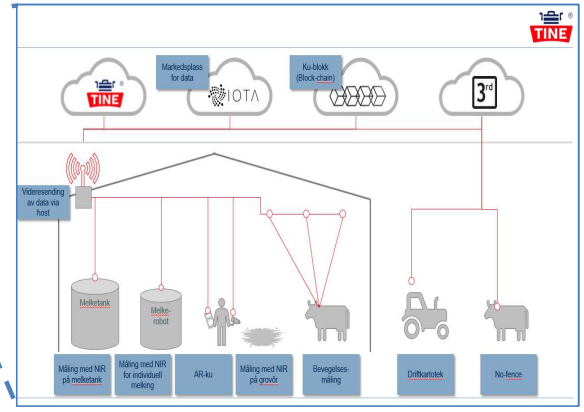


Data storage in a cloud platform

- Unlimited storage capacity
- Effective transactions of data

Farmers competency

- Biology
- Digital maturity

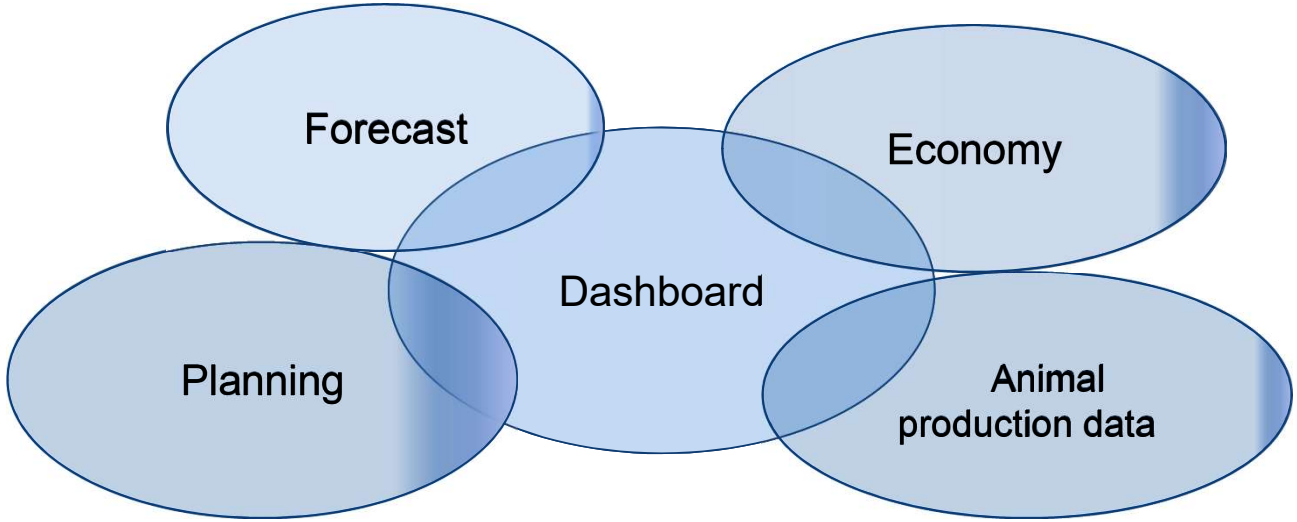


Automated data capture

- Sensors
- Integrated data between livestock and plant production

TINE Business Management tool (TBS)

A digital intelligence dashboard system,
which includes several modules of planning, decision and forecasting tools



Main objective

1) Development of a new generation digital management tool for efficient and sustainable dairy production

First version launched in September 2016. Continuous development

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TINE Business Management tool (TBS)

and Tine herd recording system (Husdyrkontrollen)

TINE Rådgiving

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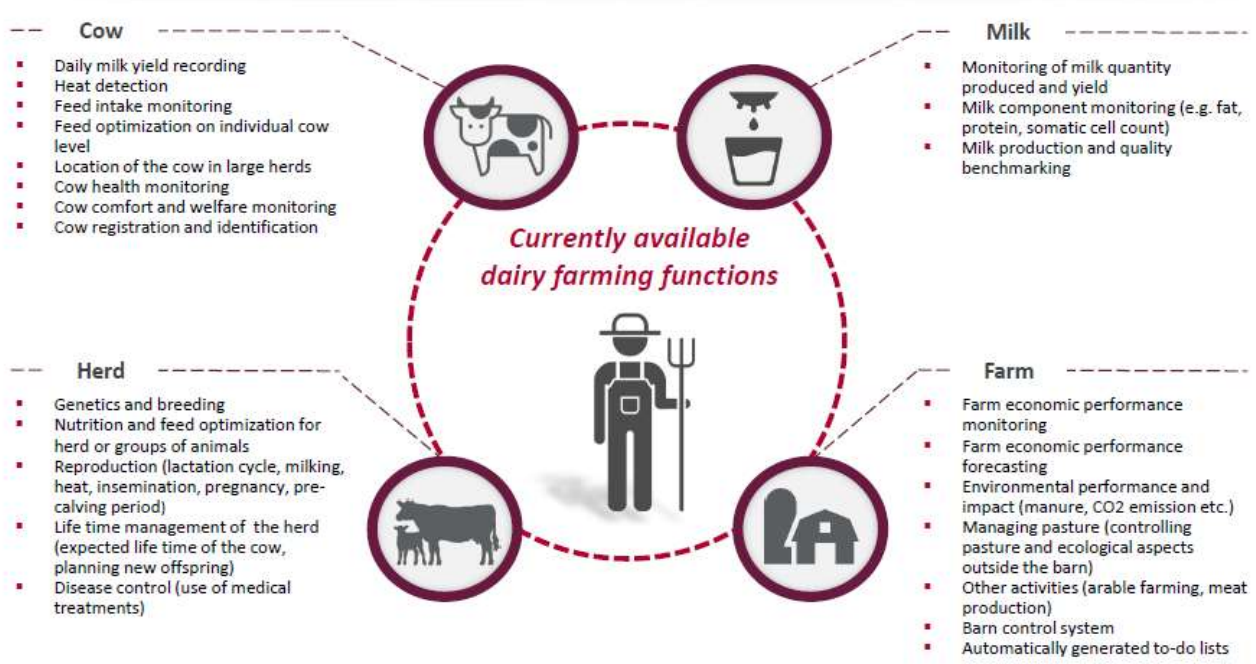
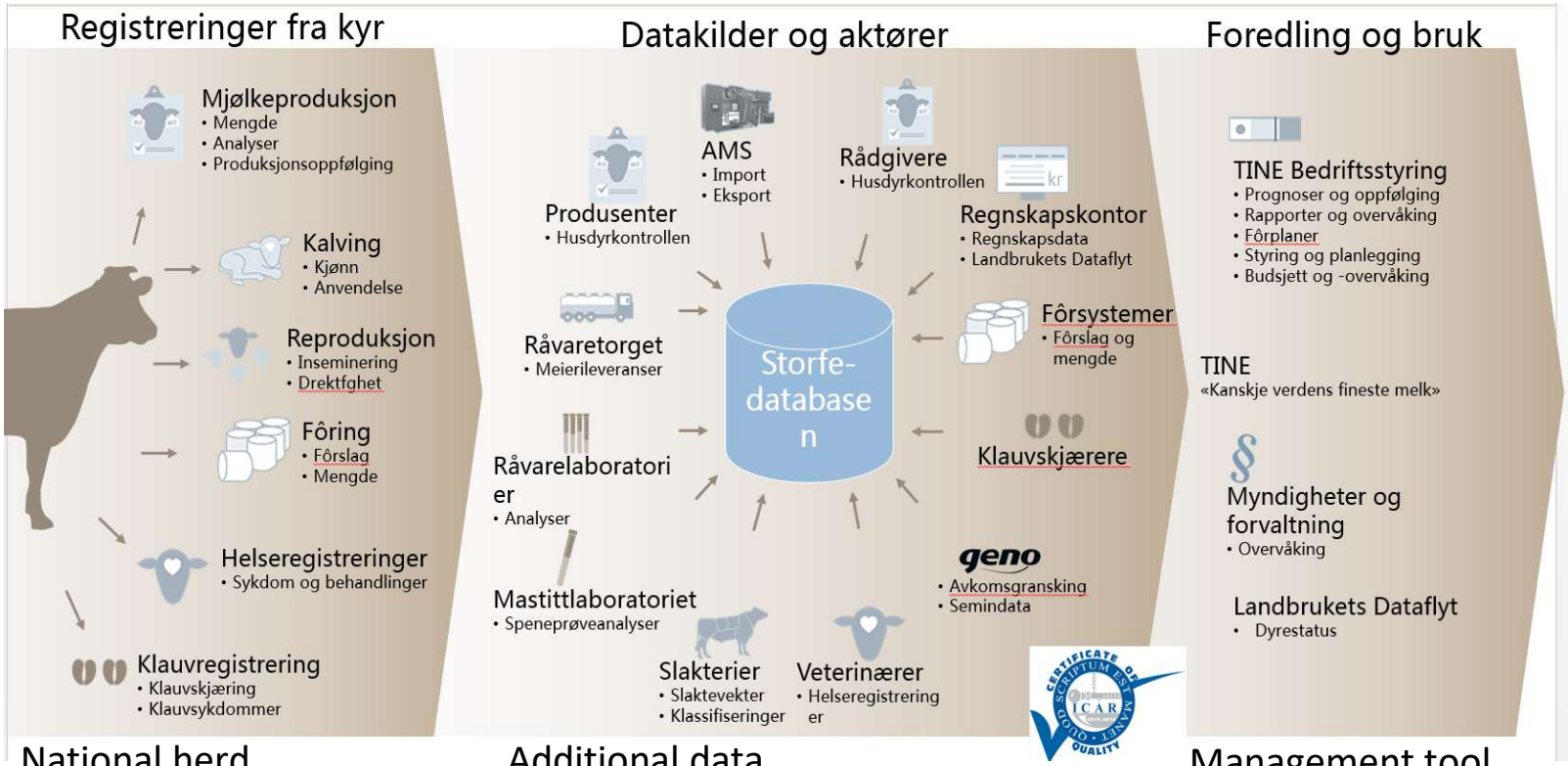
Future challenges at the farm gate

Environment and nutrient losses, green house gasses, production efficiency, feed efficiency, animal health, animal welfare, milk composition for improved human health



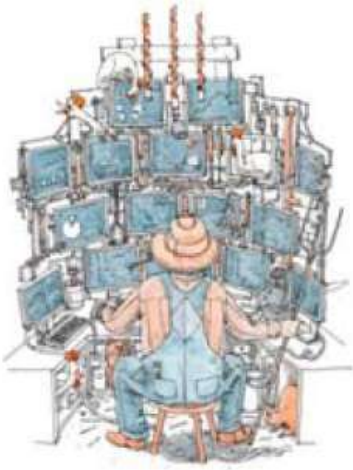
Data collection and efficient management tools

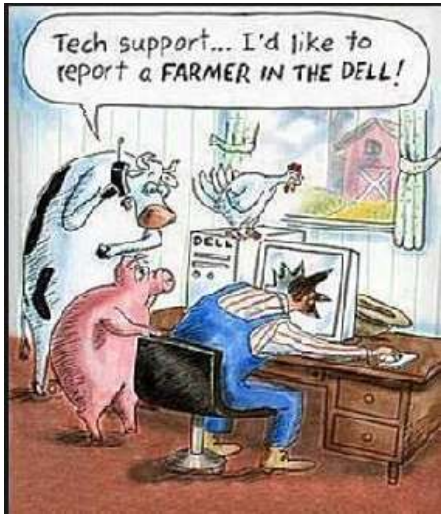


National herd recording system. Individual animal data

Additional data
Economy
Analysis
Genetics

Management tool





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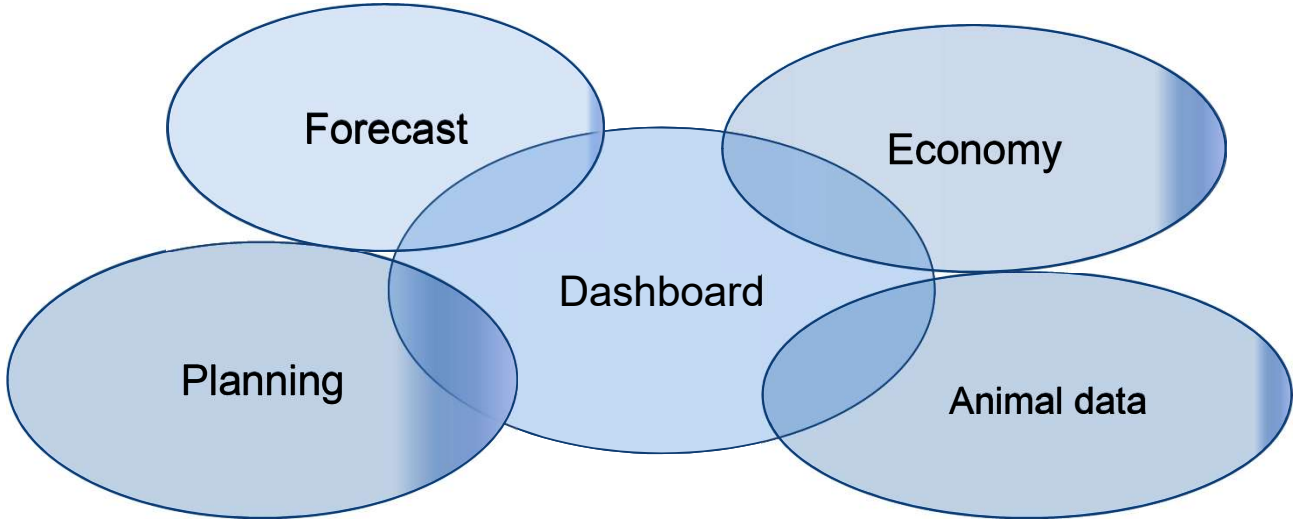

Main objective
1) Development of a new generation digital management tool for efficient and sustainable dairy production
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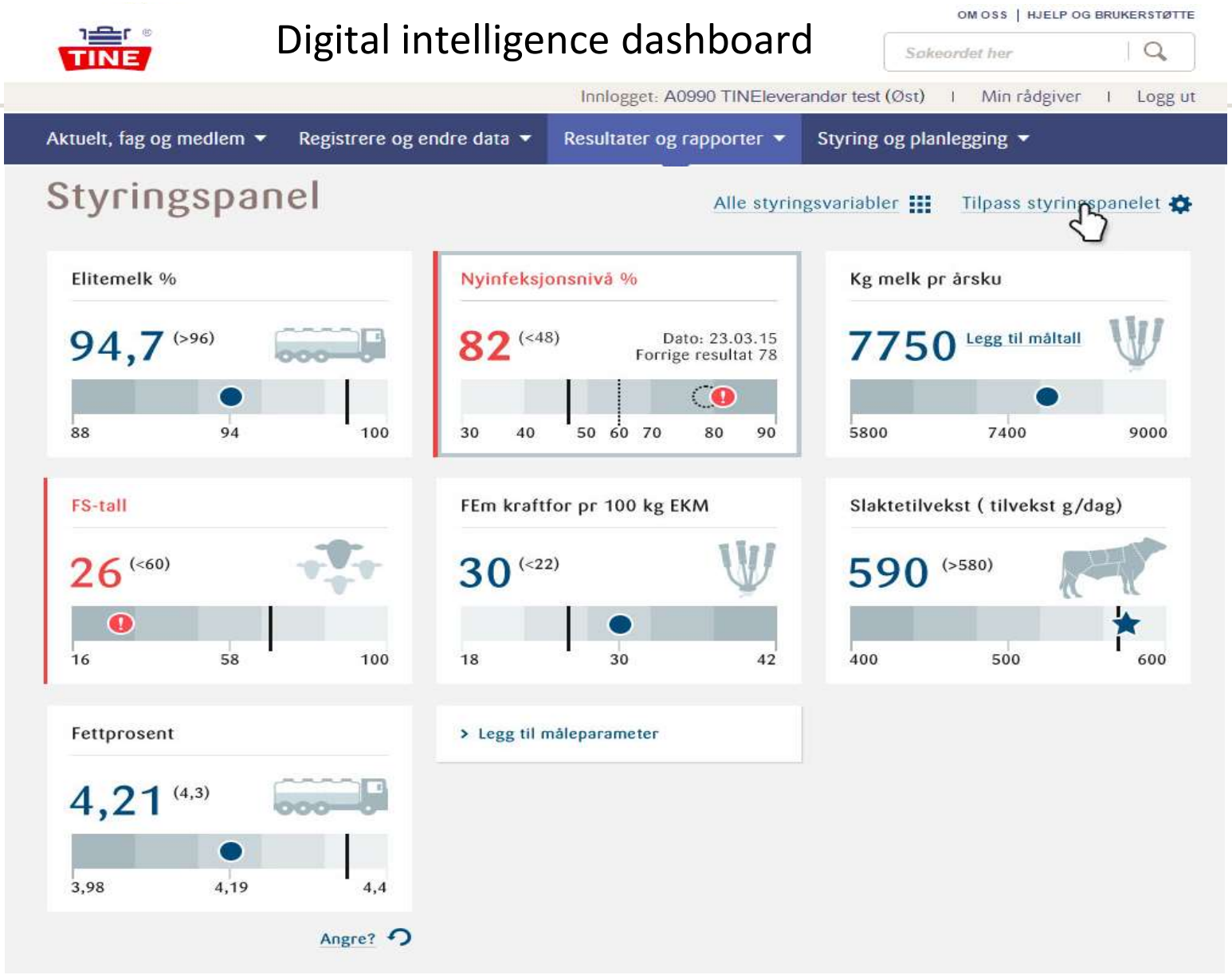
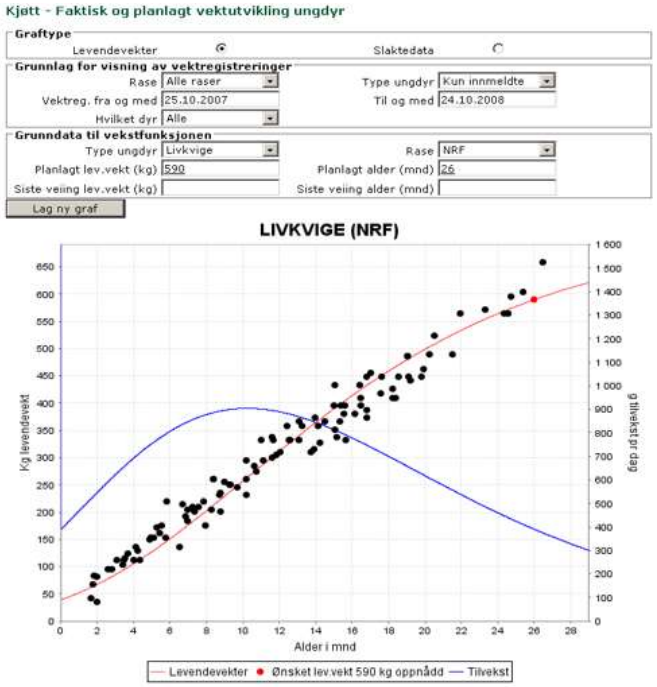
Digital intelligence dashboard

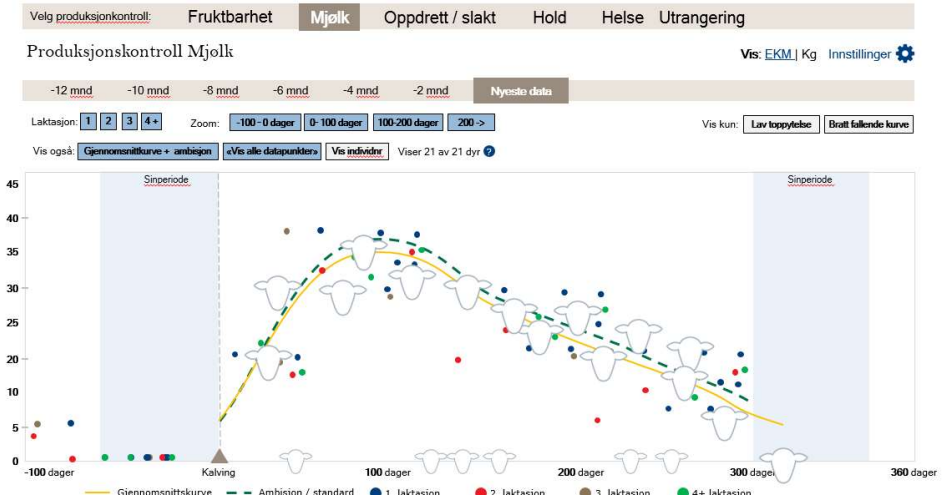


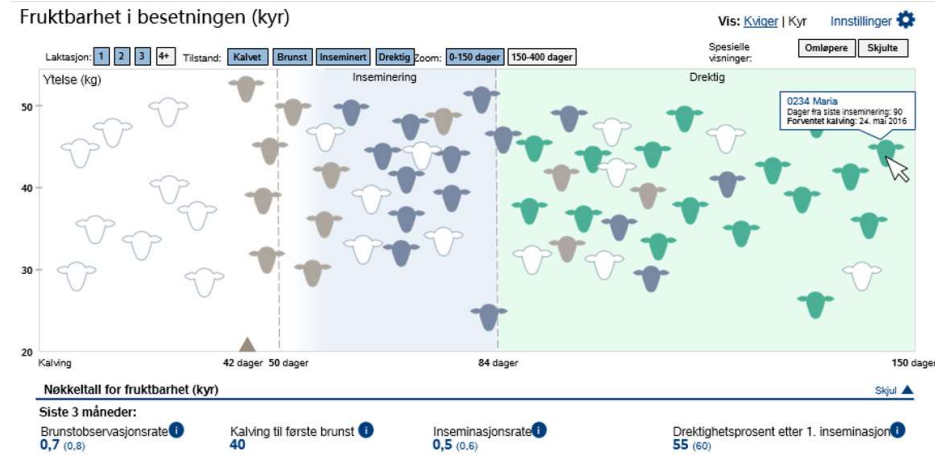
Farm targets and benchmarking

Production control

Production evaluation
- Production control milk
- Production control weight gain (heifers)
- Production control meat
- Production control fertility
- Production control feed





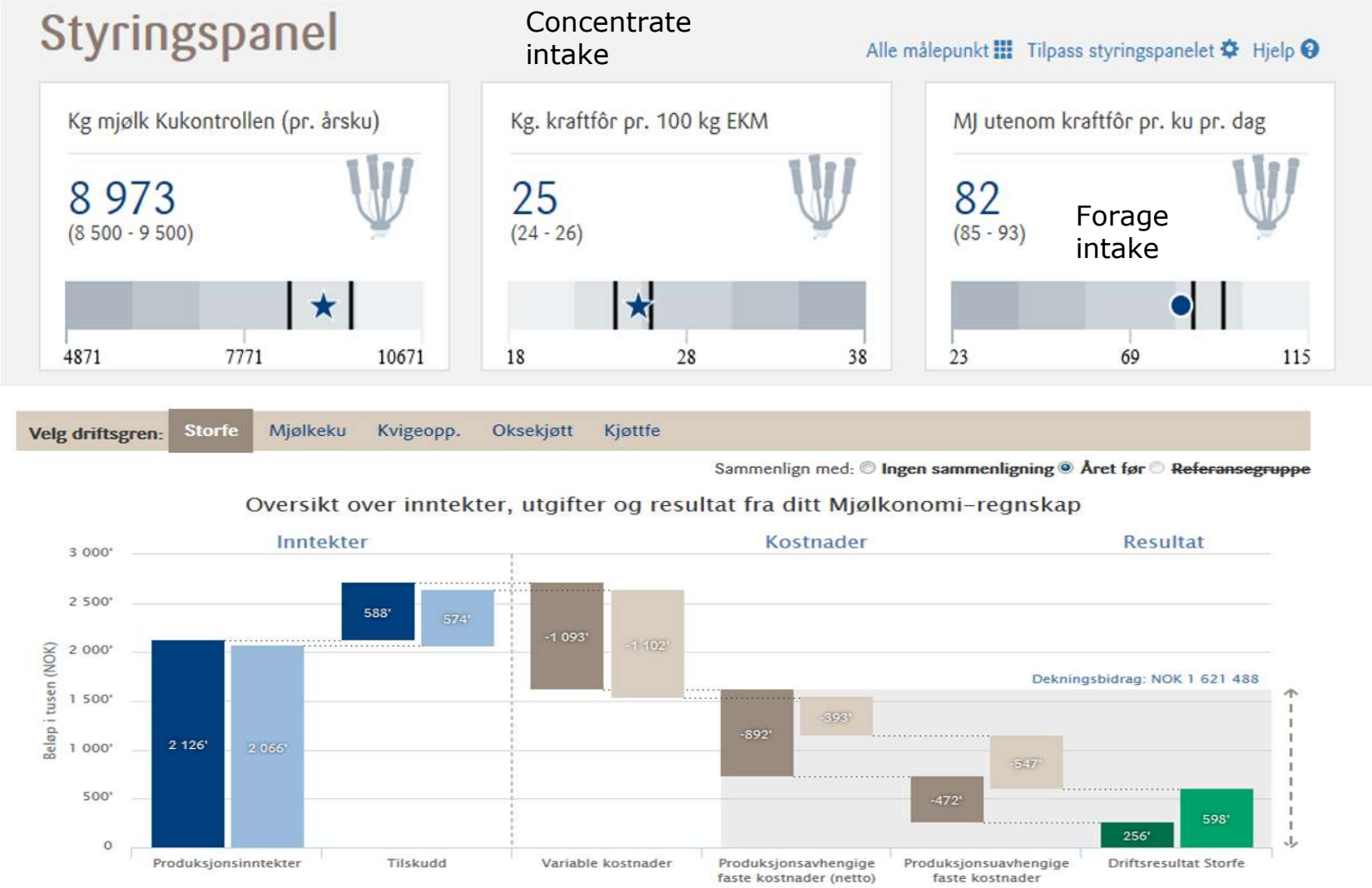


Production and evaluation planning tools

Planning tools

Feeding

Economy



Financial management tool

Key Statistics in economy

Mjølk – fôr (kr/ltr)

3,20 >3,05

2,35 | 3,05 | 3,75

Kraftfôrkostnad (kr/ltr)

1,45 <1,37

1,13 | 1,37 | 1,64

Grovfôropptak (MJ/ku/dag)

62 >58

41 | 58 | 75

Fôreffektivitet (kg EKM / kg TS)

1,65 >1,5

1,1 | 1,5 | 1,8

Levert mjølk (ltr/årsku)

8150 >6600

5300 | 6600 | 7900

Slaktetilvekst okse (g/dag)

425 >500

400 | 500 | 600

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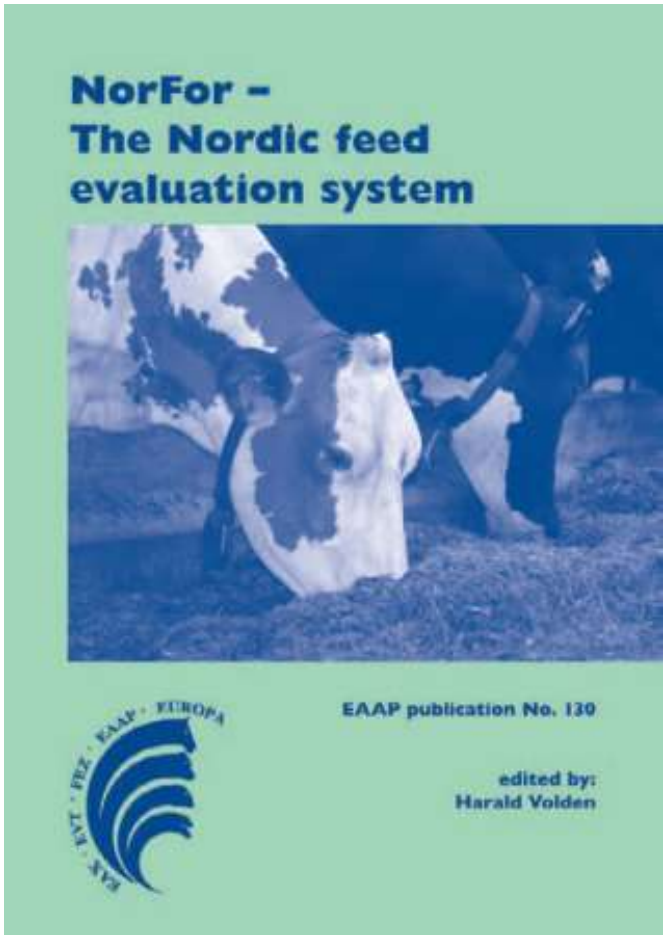
NorFor
Nordic Feed Evaluation System
TINE RÅDGIVING

NorFor – the most modern feed evaluation system in the world

- A feed evaluation system for cattle
  - Net energy
  - Metabolizable protein
  - Feed intake

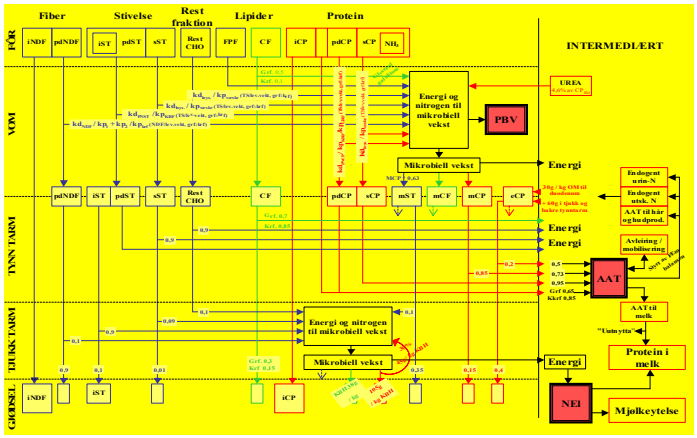
- Animal requirements and feeding standards
- Feed table
- Feed analysis and ring tests
- IT development



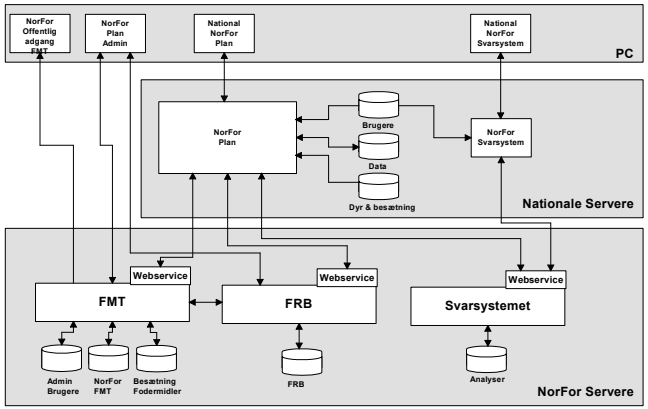
The four basic elements in NorFor

NorFor
Nordic Feed Evaluation System

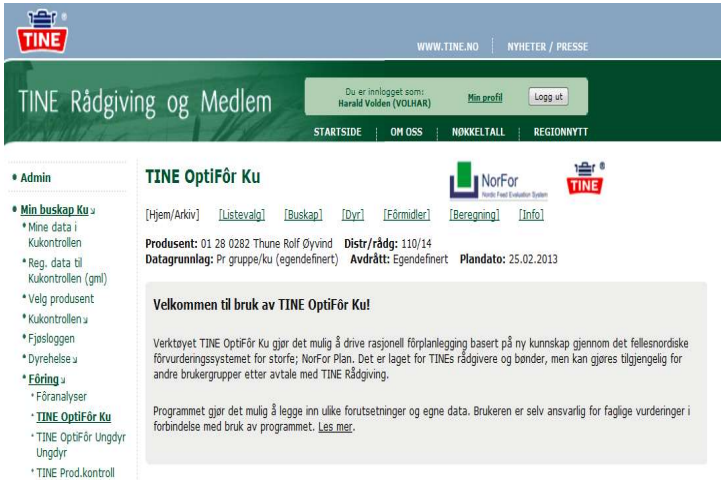
Biological



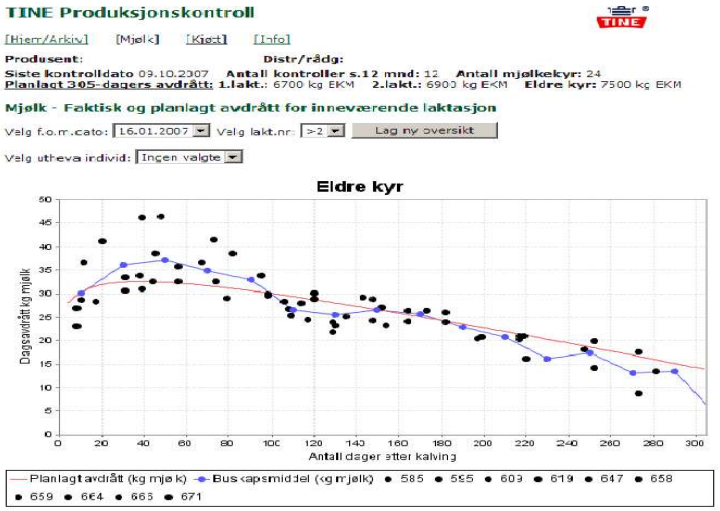
IT and data integration



National client. Ration formulation and optimisation



Production and feeding control



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5300 | 6600 | 7900

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400 | 500 | 600

TINE RÅDGIVING

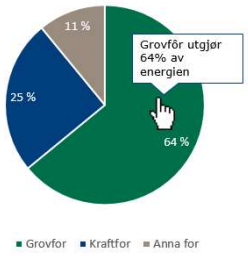
Forcasting

Individual milk production
Herd milk production
Culling strategy and animal economic value
Feeding budget

Fôrregnskap, for siste 12 måneder Endre periode

Velg dyregruppe: **Hele besetningen** | Mjølkekyr | Kviger | Okser

Energifordeling i buskapen



Samlet forbruk i perioden

Kraftfôr: 165 tonn
Lenke til noe sted?

Kg tørrstoff grovfôr: 245 tonn
(816 tonn grovfôr / # rundballer)
Lenke til noe sted?

Hvem har spist hva?

	Kyr	Kviger	Okser
	65%	15%	20%
	55%	35%	20%

Daglig forbruk i perioden (i snitt)

Kg kraftfôr: 500
Lenke til noe sted?

Kg tørrstoff grovfôr: 700
(2100 kg grovfôr / # rundballer)
Lenke til noe sted?

	Prognose mjølkeproduksjon, kg mjølk pr mnd												
	Kvoteår 2017												Kvote
	jan	feb	mar	apr	mai	jun	jul	aug	sep	okt	nov	des	jan
Antall mjølkekyr:	48	50	51	53	52	53	53	53	53	53	51	53	4
Antall mjølkende kyr pr mnd:	43	46	48	49	44	45	46	46	48	52	48	48	4
Antall avsinte kyr pr mnd:	5	4	3	4	8	8	7	7	5	1	3	5	
Antall kviger som kalva i måneden:	4	2	2	5	5	1	0	1	1	4	5	3	
Antall utrangerte dyr i måneden:	12	1	0	4	5	1	0	1	1	4	5	3	
Prognose kg mjølk pr mnd:	39319	33465	38864	35822	34190	33091	37687	39296	41602	43389	40425	38176	3641
Prognose kg mjølk i (resten av) kvoteåret:												455326	
Antall fødte kalver i buskapen:	6	4	5	7	8	7	5	7	4	8	5	5	
Antall fôrdager med kalvemjølk:	175	165	212	189	256	260	241	197	220	215	265	180	23

Aktuelle dyr			Prognose mjølkeproduksjon, kg mjølk pr ku pr mnd											
			Kvoteår 2017											
Dyr nr	Navn	Type dyr	jan	feb	mar	apr	mai	jun	jul	aug	sep	okt	nov	des
0551		Ku	888	732	730	66	0	509	1205	1198	1116	1093	991	950
0562		Ku	1267	1109	1171	1068	408	0	0	0	0	0	0	0
0575		Ku	1000	837	849	742	184	0	365	1220	1184	1182	1087	1056
0585		Ku	0	570	1177	1129	1121	1026	991	915	809	755	650	100
0590		Ku	547	143	0	166	768	0	0	0	0	0	0	0
0591		Ku	42	0	0	0	0	0	0	0	0	0	0	0
0599		Ku	923	766	771	666	512	0	0	822	1129	1145	1059	1032
0610		Ku	1146	996	1044	943	900	796	741	199	0	307	1110	859
0614		Ku	934	0	0	0	0	0	0	0	0	0	0	0
0622		Ku	701	562	237	0	151	1005	1059	1021	752	0	0	0
0623		Ku	899	750	756	227	0	0	0	0	0	0	0	0
0626		Ku	865	712	709	605	19	0	0	0	0	0	0	0

TINE RÅDGIVING

Management and technology tools for the future

The road to improved production efficiency

TINE Rådgiving

Harald Volden

TINE advisory service

Norwegian University of Life Sciences

Norges miljø- og biovitenskapelige universitet