Villa Contarini, 29th September 2023

III International Workshop Caseus

SOME TECHNICAL RESILIENT SOLUTIONS IN DAIRY FARMS

Serena Soffiantini

Alberto Menghi

PROGRAMME

11.00 WELCOME and INTRODUCTION by APROLAV (President TERENZIO BORGA)

11.10 Introduction on farmers needs as defined by R4D project (Valérie Brocard - Project coordinator - IDELE- FRANCE), Serena Soffiantini and Alberto Menghi (Italian partner - CRPA - ITALY)

11.20   Mastitis detection (Kelly Schmit - LTA, Lycée Technique Agricole - LUXEMBOURG)

11.30   Strategic Hoof trimming (George Ramsbottom - TEAGASC - IRELAND)

11.40   Colostrum management (Sandra Debevere - INAGRO - BELGIUM)

11.50   Young stock weight (Evi Canniere - INAGRO - BELGIUM)

12.00 Conclusions and Q&A

Villa Contarini, 29th September 2023

R4D FRAMEWORK AND INVENTORY OF NEEDS

Valérie Brocard
IDELE, France

Serena Soffiantini
Alberto Menghi
CRPA, Italy

Dairy Production in France

Production 1984-2021

		1984	2015	2021
Milk yield	[mil. tonnes]	26,1	25.4	24.9
Dairy farms	[x 1000]	427	67	54
Dairy cows	[x 1,000,000]	6,764	3,637	3,322
Milk yield	[kg/cow p.a.]	3,859	6,990	7,500
Avg. herd size	[cows/farm]	16	59	68

Monthly milk deliveries

Source : GEB - Institut de l'Élevage d'après Eurostat et FranceAgriMer
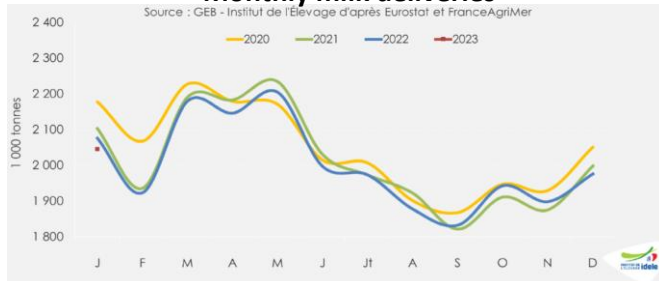
- maize silage
- sorghum silage
- fodderbeets
- grass silage
- haylage
- hay
- grazed grass
- other forages
- cereals
- beans
- oilseeds grains
- protein cakes
- conc. byproducts
- additives+minerals
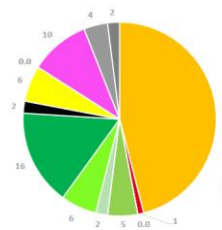
Average yearly diet of a French dairy cow

Husbandry system

- Year-round calving
- Freestall barns (cubicles/deep bedding), plain or slatted floors, slurry or manure collection
- Main breeds: Holstein, Normande (plains)
                     Montbéliarde (piedmonts and mountains),   + crossbreds
- First calving: 29 months old
- Lactations: 2.5 on average

Grazing system

- Main systems: rotational grazing
                     combination of continuous + rotational
- Pasture access: 90 % of dairy cows
- Grazing season: 6-10 months/year
- Daily grazing time: 6-20 hours per day

Regional distribution
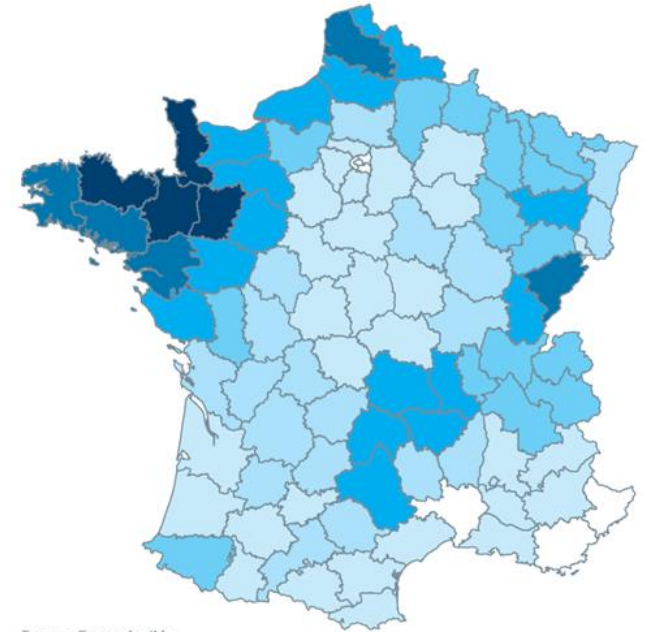

Source : FranceAgriMer

Challenges, targets, actions?

Challenges

- **Facing climate change and hazards**
- **Reduce carbon footprint of milk and GHG emissions**
- **Increasing protein self-sufficiency**
- **Decreasing costs of inputs and energy**
- **Facing the decrease in organic milk consumption**
- **Generational renewal, attractiveness of dairy farming**
- **Dairy to beef**
- **Animal welfare/Happy cow**

Online survey on farmers' needs - France
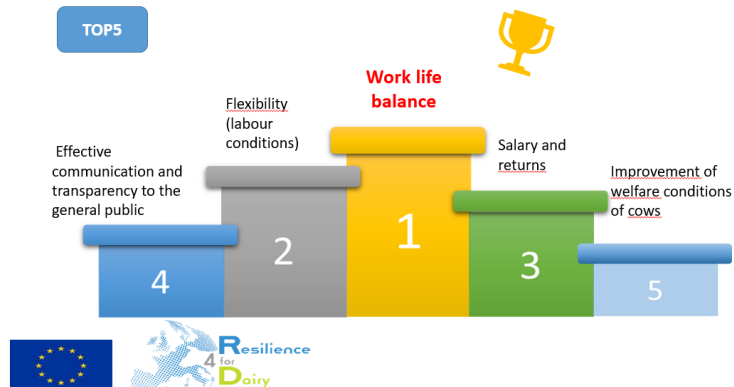
2030 - Targets

- Reduce agricultural GHG emissions from 81 to 65 mil. tonnes CO2e (-20 % between 2030 and 2021) and – 46% between 2050 and 2015
- Reduce N surplus to 90 kg/ha
- Increase organic farming area to 15 % of land use
- Increase area of oilseeds, protein crops and legumes to 8% of AA (2 millions ha)
- Achieve good ecological status in 100 % of water bodies
- Increase biodiversity by hedges and grassland
- Increase animal welfare (housing, outdoor access, transport,…)

What are the actions that are required?

Pathways to Dairy Net Zero

Cap Protéines: a roadmap to increase protein self sufficiency at farm and territorial level, to cut imports of 1.5 millions tons of soya cakes

Resilience – KEY AREAS:

1.Economic and social resilience	STRATEGIC BUSINESS PLANNING, QUALITY OF LIFE AND GENERATIONAL RENEWAL
2.Technical Efficiency	BEST PRACTICES AND TECHNICAL INNOVATIONS
3.Environment, welfare and society	ADDRESSING THE RESPONSIVENESS OF THE DAIRY SECTOR TO SOCIETAL NEEDS

FINAL OBJECTIVE

Establish a range of ***best practices*** that are tailored to answer farmer's specific needs and society's expectations.

**100 Factsheets
POTENTIAL SOLUTIONS**

Resilience 4 for Dairy

1ST STEP

INVENTORY of NEEDS
to improve farm resilience

2022 - Online survey

15 Countries

Economic and social resilience	FINANCIAL NEEDS	Easy access to credit
	BUSINESS MANAGEMENT: IMPROVE STRATEGIC SKILLS AND BUILD ROBUST BUSINESS MODELS	Strategic management and innovative resilience skills
		Economic calculators for on farm decision making
		Multi-purpose farm (e.g. teaching farm, biogas production farm, milk production, agro-tourism, care farm)
		Added value milk (e.g. farm house cheese, hay or grass milk)
	INFORMATION SOURCES, KNOWLEDGE, TRAINING	Reliable information sources, knowledge and training (e.g. webinars, courses, lectures)
		Innovative channel of information
	LABOUR CONDITIONS	Flexibility
		Salary/returns
		Work-life balance
		Career progression
Technical Efficiency	DAIRY CATTLE MANAGEMENT (housing, genetic, feeding system,...)	Innovative milking devices (e.g. robots)
		Innovative milking strategies (e.g. extended lactation)
		Innovative feeding systems for calves (feed composition, preparation and distribution)
		Innovative feeding systems for cows (feed composition, preparation and distribution)
		Individual/herd milk yield estimator/recorder
		Innovative detectors/devices for metabolic disease, pathologies (e.g. mastitis, lameness), estrum, eating/grazing behaviour, calving time detectors
		Innovative devices for animal identification and/or localization
		Innovative reproduction (e.g. embryo transfer, sexed semen, cross breeding) and genetic/genomic tools and strategies
		Innovative devices for measuring grass growth and techniques for grazing management
	ANIMAL NUTRITION	Innovative feed production, storage techniques and technologies
		Innovative hay production/management techniques and technologies
		Innovative silage production/management techniques and technologies
		Innovative TMR production/management technologies and techniques
		Innovative and/or special supplements
		Feed additives to mitigate Methane emissions
	ANIMAL HEALTH (and fertility)	Prevention (e.g. vaccination, good practice)
		Innovative testing/analysis for early detection of diseases (e.g. mastitis, infertility, metabolic diseases, lameness)
		Innovative therapies
Environment, welfare and society	ANIMAL WELFARE	Improvement of welfare conditions of calves
		Improvement of welfare conditions of cows
		Environmental recording and assessment
		Animal parameters recording and assessment
		Automatic microclimate regulation (e.g. sprinkler activated by temperature)
		Innovative and animal-friendly housing
	ECOLOGICAL AND ENVIRONMENTAL FOOTPRINT/MITIGATION OF CLIMATE CHANGE/INPUTS EFFICIENCY	Improving biodiversity
		Environmental footprint assessment techniques and devices
		Mitigation practices and strategies (e.g. to reduce GHG and/or ammonia emissions)
		Efficiency of nitrogen use (e.g. feeding and grassland use)
		Soil management (e.g. land rotation)
		Energy efficiency and use of renewable energy sources
	SOCIAL ISSUES: BUILD SOCIETY FRIENDLY SYSTEM	Reducing antibiotic use (e.g. blanket dry cow therapy)
		Effective communication and transparency to the general public of agricultural practices and the role of agriculture in society

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RESULTS

	COUNTRY	NUMBER OF RESPONSES
1	FLEMISH REGION (BE)	91
2	WALLON REGION (BE)	87
3	DENMARK	12
4	FRANCE	38
5	FINLAND	34
6	IRELAND	9
7	GERMANY	23
8	ITALY	55
9	LITHUANIA	14
10	LUXEMBOURG	16
11	HUNGARY	23
12	THE NETHERLANDS	25
13	NORTHERN IRELAND	14
14	POLAND	14
15	SLOVENIA	46
16	SPAIN	34
	TOTAL	535

SAMPLE SIZE
No. 535

European overall results

RANK	NEEDS - European overall ranking - Top 20	%
1	**Work-life balance – QUALITY OF LIFE**	83%
2	Improvement of welfare conditions of cows – ANIMAL WELFARE	81%
3	Salary/returns – QUALITY OF LIFE	80%
4	Innovative testing/analysis for early detection of diseases (e.g. mastitis, infertility, metabolic diseases, lameness) – PREVENTION - EARLY DETECTION	79%
5	Effective communication and transparency to the general public of agricultural practices and the role of agriculture in society – COMMUNICATION	77%
6	Improvement of welfare conditions of calves – ANIMAL WELFARE	76%
7	Flexibility – QUALITY OF LIFE	76%
8	Energy efficiency and use of renewable energy sources – ENVIRONMENT	74%
9	Innovative detectors/devices for metabolic disease, pathologies (e.g. mastitis, lameness), estrum, eating/grazing behaviour, calving time detectors – PREVENTION - EARLY DETECTION	73%
10	Innovative and animal-friendly housing – ANIMAL WELFARE	73%
11	Efficiency of nitrogen use (e.g. feeding and grassland use) – ENVIRONMENT	72%
12	Soil management (e.g. land rotation) – ENVIRONMENT	71%
13	Reliable information sources, knowledge and training (e.g. webinars, courses, lectures) – MANAGEMENT	69%
14	Economic calculators for on farm decision making – MANAGEMENT	68%
15	Prevention (e.g. vaccination, good practice) – PREVENTION	68%
16	Innovative feeding systems for cows (feed composition, preparation and distribution) – INNOV. IN FEED	67%
17	Strategic management and innovative resilience skills – MANAGEMENT	64%
18	Innovative silage production/management techniques and technologies – INNOV. IN FEED	64%
19	Reducing antibiotic use (e.g. blanket dry cow therapy) - AM REDUCTION	63%
20	Innovative feed production, storage techniques and technologies – INNOV. IN FEED	62%

Further investigations by cluster

Farmers	379
Different professions	156

Farmers	379
More than 100 cows	170

Up to 39 years	164
Over 40 years	371

Male	405
Female	125
Prefer not to say	5

ISCED 1-5 (Within tertiary education level)	239
ISCED 6-8 (Bachelor's level or upper level)	296

Highlights

- The ranking shows the **variety of needs** that farmers have to face

- Results are homogeneous comparing different clusters

- The **main themes** are:
  - *farmers welfare (work-life balance, salary, work flexibility)*
  - *animal welfare (cow and calves) and animal health (+++prevention → AM reduction)*
  - *communication with civil society*
  - *environmental sustainability (renewable energy)*
  - *management (farmers education, data driven decisions tools)*

- Improvement of "***Work-life balance***" and "***Transparent and effective communication with civil society***" are in the top 5 issues, just on the same level of other more technical or economic challenges

- ***"Work-life balance"*** is always in the first 3 top positions regardless clusters (often 1st position): it is comprehensive parameter (*it is the final effect of other needs*)

Thank you

www.resilience4dairy.eu

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Colostrum management:
give your calves sufficent high quality colostrum to become productive cows

29-9-2023

Sandra Debevere (Inagro)

Project "Veepeiler rund"*:

17% of the calves have **insufficient colostrum antibodies****
in their blood

Calves with insufficient colostrum antibodies in their blood
are **2.6 times more likely to die** than other calves

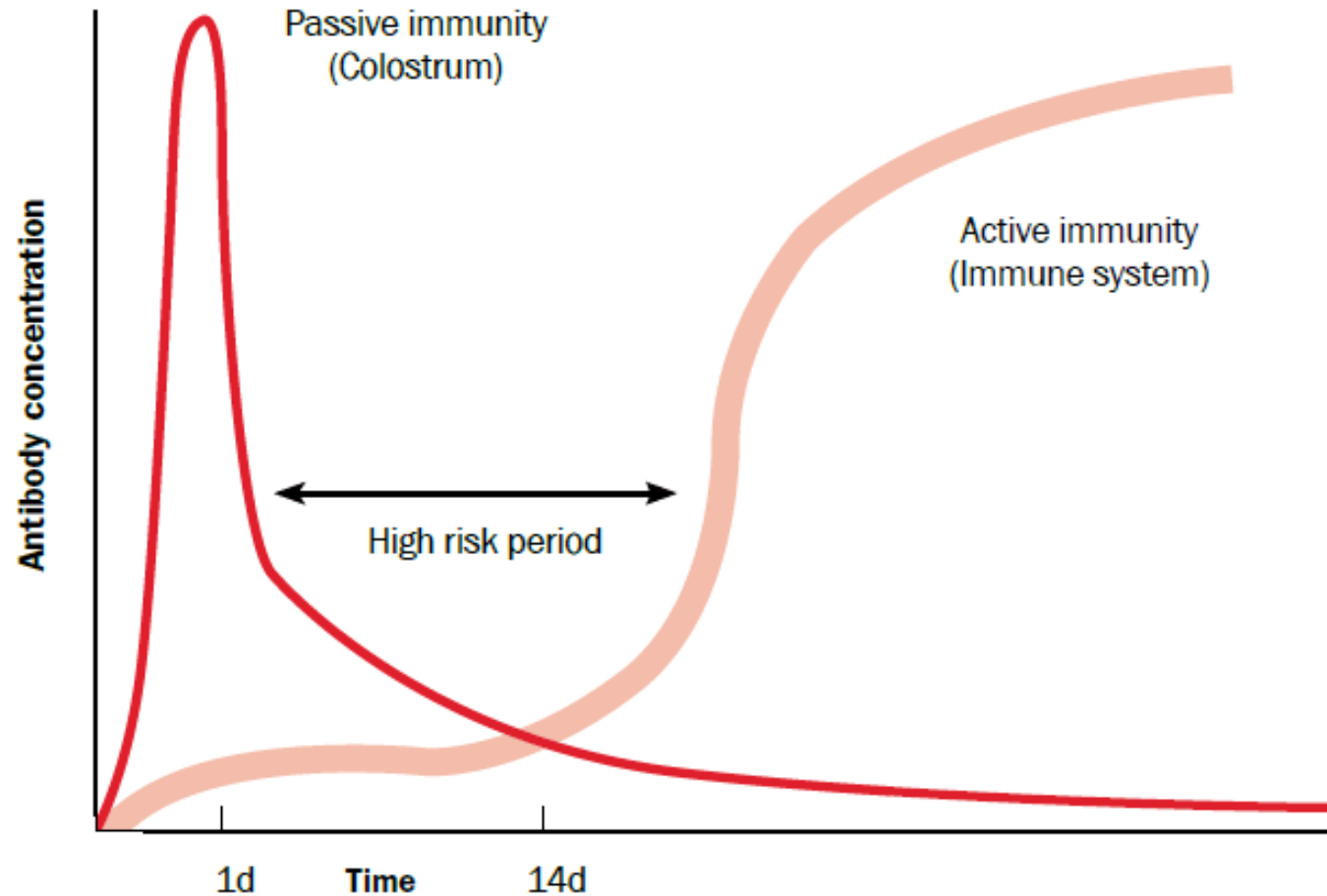*Belgian study on Flemish 87 farms with dairy and beef cattle
Source: https://edepot.wur.nl/530045

**Reference value: 10 g/l (sick vs not sick)

Calves are dependent on antibodies in colosturm after birth

- Calves: born without active immunity
- Totally dependent on passive immunity via colostrum

Development of passive and active immunity in the calf

Passive immunity (Colostrum)

Active immunity (Immune system)

Antibody concentration

High risk period

1d   Time   14d

| **Background** | Colostrum management | Specific advices |

Colostrum management is more than just giving colostrum

Steps for a good colostrum management

| 1. Dry period | 2. Colostrum quality | 3. Colostrum intake | 4. Storage |

Colostrum management starts already before calving

- Dry matter intake (target value (TV): 12kg DM/day)

- Crude protein (TV: 13-14% CP in far-off, 14-15% in close-up)

- Vitamins and minerals (Selenium: ≥1,5mg/day; vitamin E: 1000 - 1200 units extra in dry period...)

- Access to (clean) water (intake: min. 40L/day)

Check the quality of colostrum

- Milk the cow directly after giving birth

- Check the colostrum quality
  (>22 brix or 55 IgG/L)
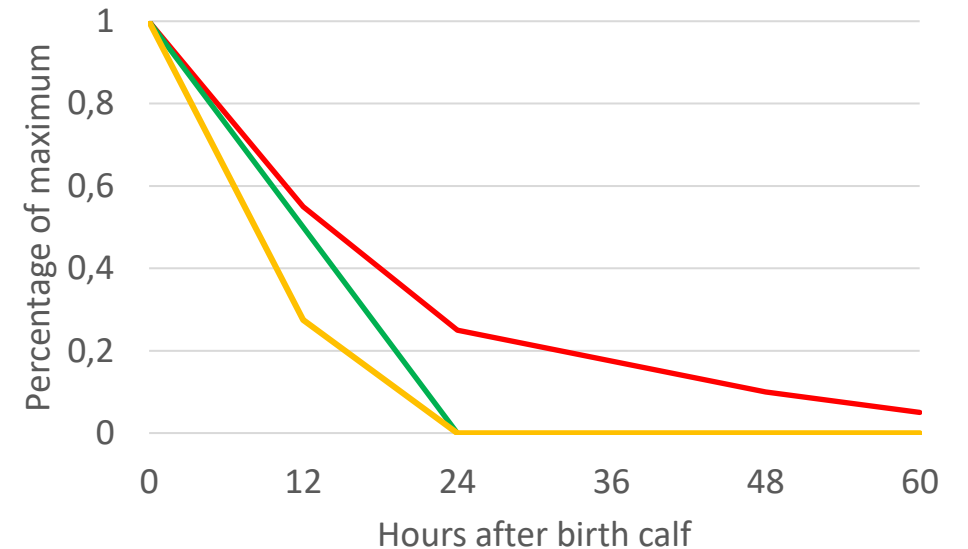
Level antibodies (IgG) in colostrum in udder

Uptake capacity IgG in intestine calf

Delayed milking + colostrum delivery

Check the quality of colostrum

- Milk the cow directly after giving birth
- Check the colostrum quality
  (>22 brix or 55 IgG/L)

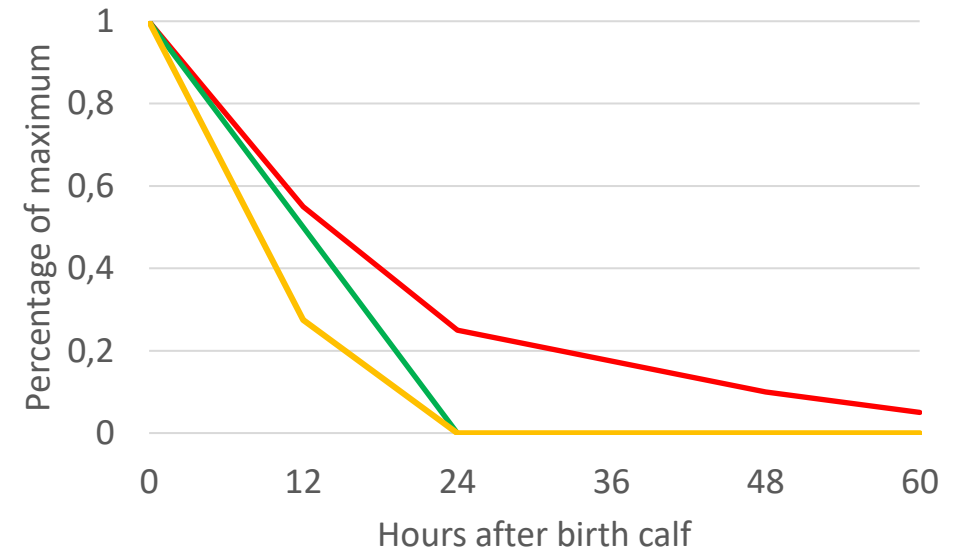| Temperature independent	Temperature dependent
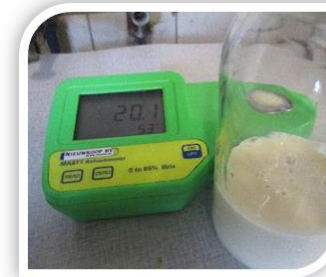
Digital refractometer

Colostro balls

Analog refractometer

Densimeter

Background   **Colostrum management**   Specific advices
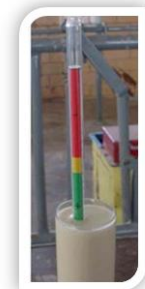
Time is money!

- Feed colostrum **within 6 hours**

- Minimum 220g IgG,
  strive for 300g IgG

Level antibodies (IgG) in colostrum in udder

Uptake capacity IgG in intestine calf

Delayed milking + colostrum delivery

Refractometer (brix)	Densimeter	Colostro Balls	IgG (g/L)	Litre
14	1028			
15				
16			Give in this situation an alternative, e.g. colostrum stored in the freezer!	
17				
18	1030	🔴🔴		
19				
20	1035	🔴🔴🟠	24	9
21			35	6
22	1045	🔴🔴🟠🟢	47	5
23			58	4
24			70	3
25	1060	🔴🔴🟠🟢🟢	82	3
26			93	2
27			105	2
28			116	2
29	1075	🔴🔴🟠🟢🟢🟢	128	2
30			139	2

Goal: administer minimum 220g
IgG within 6 hours after birth!

Don't waste good colostrum by incorrect storage

- Store colostrum immediately and hygenically

- In the fridge (max. 2 days)

- In the freezer (max. 1 year)

- Defrost slowly (water bath, fridge), never above 60°C (no microwave!)

Things to remember:

- Drench probe can be used if calf doesn't drink enough
- Colostrum check can be performed to check colostrum management
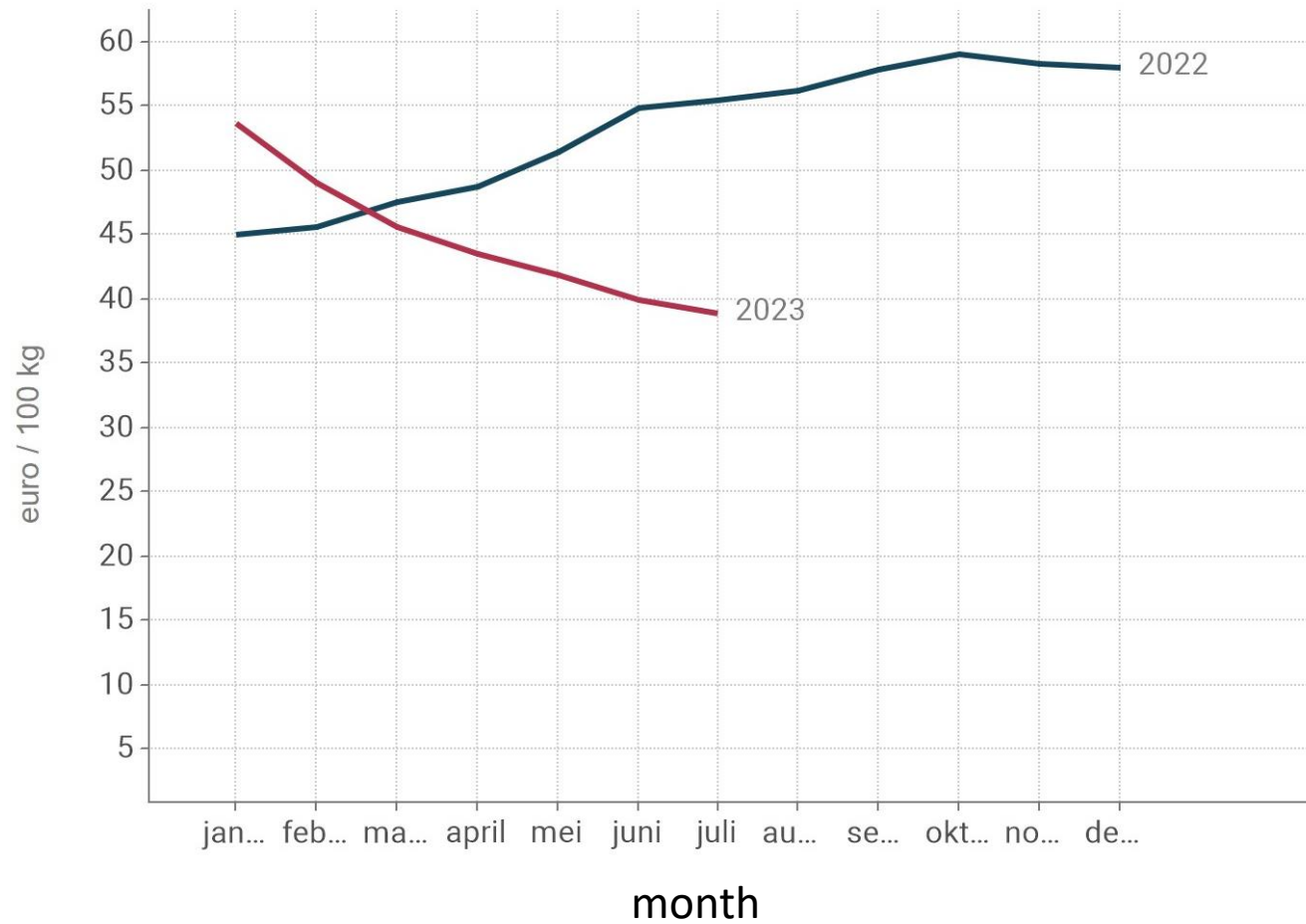- Key words:
  - Quick
  - Fresh
  - Much
  - Often

Key figures Belgium - Flanders

Main number of dairy cows

Main number of dairy farms
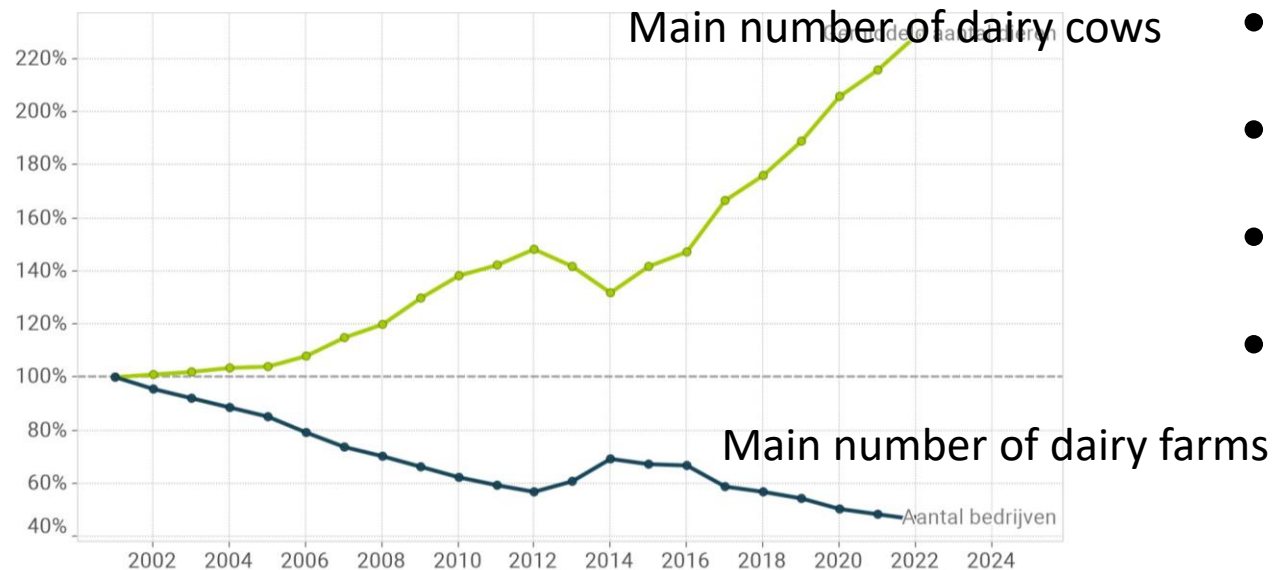
In Belgium (Flanders), in 2022:

- 8.258 (4.593) dairy farms

- 524.949 (339.580) dairy cows

- ±64 (74) cows/dairy farm

- Milk production:
> 4 billion L milk / year
(70% in Flanders, 30% in Wallonia)

Milk price Belgium (fat & protein corrected milk)

Thank you!!!!

Measuring young stock
for optimal growth

29-9-2023

Sandra Debevere (Inagro)

Evi Canniere (Inagro)

Healthy growth during the first two years of life results in sufficiently mature heifers calving at **24 months**.

Mean age at first calving (**AFC**) in Europe: **26 months***

Get insight in the growth of your calves

Measuring on a regular basis:

- Detect at early stage if growth is not optimal

- Intervene quickly

- Optimizing growth:
  - lower rearing costs
  - Higher milk production
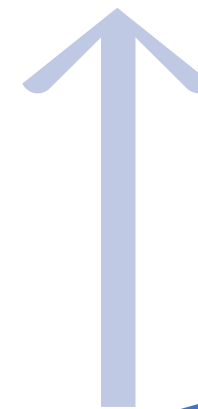 - More sustainable livestock

3 methods possible to measure growth

Weighing

Measuring chest circumference

Measuring rump height

Weighing: precise but labour intensive

Weighing | Measuring chest circumference | Measuring rump height

- Most precise method
- Need of a good weighing scale (€)
- Labour intensive

Measuring chest circumference: good alternative
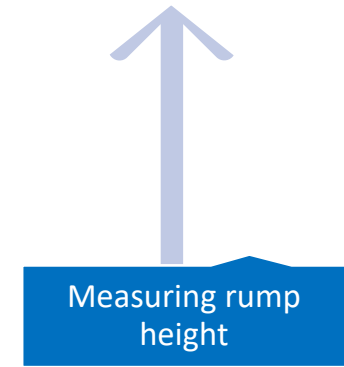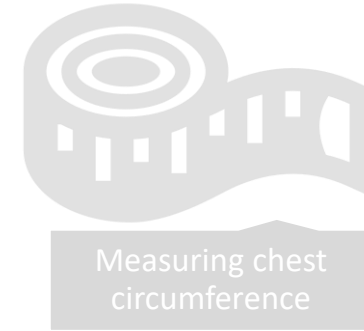

| Weighing | Measuring chest circumference | Measuring rump height |

- Tape behind the elbows
- Don't tighten too much (2 fingers below tape)
- Animal must stand nicely squared
- Based on this measurement
  → weight can be estimated

Measuring rump height: not that good alternative

Weighing	Measuring chest circumference	Measuring rump height

- Flat horizontal surface needed
- Chick with a spirit level
- Measure height at 2 hip bones
- Animal must stand nicely squared
- Based on this measurement
  → weight can be estimated

Optimal growth curve for **Holstein** calves

Weight (kg)	Chest circumference (cm)	Rump height (cm)
40	75	81
45	78	83
55	84	87
65	89	90
75	94	93
2 months **85**	**99**	**95**
100	105	99
110	108	101
125	114	104
145	120	107
160	125	110
180	130	113
6 months **200**	**135**	**116**
220	140	118
240	145	121
265	150	124
290	155	126
315	160	129
345	166	132
370	170	134
13 months **400**	**175**	**137**
435	180	139
470	186	142
505	191	144
545	196	147
585	201	150
625	206	152
665	211	155
710	216	157

Important growth milestones for Holstein calves:
- 2 months: 80-85kg
- 6 months: 200kg
- 13 months: 380-400kg
- At calving: 630kg (calf included)

Specific advice

Link measuring with fixed moments

(e.g. weaning, moving pen/stable)

→ Help making regular measuring become a habit

Thank you!!!!

Ireland's pasture-based dairy sector

Herd size (cows)	93
First lactation (%)	19
Milk yield (kg/cow)	5,874
Milk fat plus protein (kg/cow)	442
Milk fat plus protein (kg/kg LW)	0.83
Calving interval (days)	388
6 week calving rate (%)	67
Concentrate (kg DM/ cow)	1,222
Other supplements (kg DM/cow)	0
N mineral fertiliser (kg/ha)	164
Grassland area (%)	95
Forage crop area (%)	5
Stocking rate (cow/ha; kg LW/ha)	2.1; 1,150

2022 Milk price (€ cent/l)	60.0
2022 Total costs (€ cent/l excl. family labour)	35.5
Net profit (€/ha farmed)	2,253
Debt (€/cow)	900
Debt servicing (€ cent/ l)	0.6
N surplus (kg N/ha)	173
C intensity (kg CO2 eq./ kg FPCM)	0.88
Agriculture GHG emissions (share %)	37
Methane (% of total Ag GHG emissions)	72

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Factsheet 204

Topic
Technical Efficiency

Topic
Animal Welfare

Topic
Economic Resilience

Strategic hoof trimming to improve herd health status and longevity

Background

Lameness is a major animal welfare concern within the dairy industry, and leads to financial losses. Strategic hoof trimming, also knows as routine hoof trimming, is a preventative practice where the entire herd has their hooves examined (and trimmed if required).

How does the strategy work?

Routine inspection of the entire herd

Lift cows in trimming crate → Inspect hooves and trim if required

When
- Minimum 1 x per year (at drying off)
- Second routine inspection ~8 weeks post-partum may be beneficial

Suggested method
Five-step Dutch method

Equipment involved? Investment? + + + Adequate training of farmer (course/mentor)

OR

Pay a trained hoof trimmer to carry out routine hoof trimming on your farm

Positive features:
- Restore hoof conformation across the medial and lateral claws
- Detection and treatment of mild lesions that are not yet causing lameness
- Reduce the number of cows with overgrown claws, which is a risk to some lesion types
- Identify the most common lesions, allowing associated risks to be minimised on farm
- Prevention of future lameness cases, improving longevity and animal welfare and reducing economic costs

Be careful, especially on these points:
- Hoof trimming must be carried out by trained personnel
- Care must be taken not to over-trim
- Do not wait until your scheduled routine trim to treat a cow identified as lame, treat as soon as possible

Specific advice:
- Routine trimming should be seen as a 'routine inspection'. Upon inspection of the hoof, trained personnel should decide if trimming is required
- Cows walking long distances to pasture may not require routine trimming, however, should still be inspected

Assessment of method

Quote of the farmer:
"Routine trimming helped me to reduce the lameness prevalence in my herd, saving me time and money"

- Lameness is a major animal welfare concern within the dairy industry, and leads to financial losses
- Median herd lameness prevalence in Ireland is 7.9% during grazing and 9.1% during housing (Browne et al. 2022), but has been reported high as 55% in North America (von Keyserlingk et al., 2012)
- Strategic hoof trimming, also knows as routine hoof trimming, is a preventative practice where the entire herd has their hooves examined (and trimmed if required)
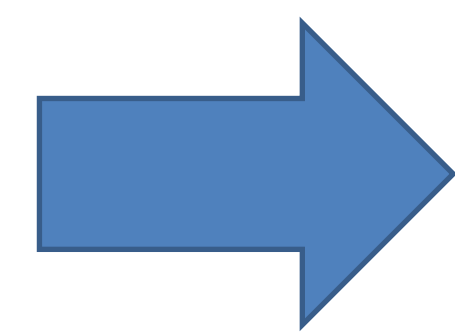

In 2019/2020 only 6% of dairy farmers in Ireland carried out routine trimming of their herd housing (Browne et al., 2022)

Routine inspection of the entire herd

Lift cows in trimming crate → Inspect hooves and trim if required

When

Minimum 1 x per year (at drying off)

Second routine inspection ~8 weeks post-partum may be beneficial

Suggested method

Five-step Dutch method

Functional trimming
1) Trim toe length to correct length
2) Match untrimmed claw length/level
3) Model (dish) out sole ulcer site

Corrective trimming
4) Relieve weight off painful claw
5) Remove loose/under-run horn and hard ridges in high risk zones

Option 1

+

+

Adequate training of farmer (course/ mentor)

Option 2

Pay a trained hoof trimmer to carry out routine hoof trimming on your farm

Usually a call out fee, plus a cost per cow

- Restores hoof conformation across the medial and lateral claws
- Detection and treatment of mild lesions that are not yet causing lameness
- Reduce the number of cows with overgrown claws, which is a risk to some lesion types
- Identify the most common lesions, allowing associated risks to be minimised on farm
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Further advice on lameness can be found in the following book: https://www.teagasc.ie/publications/2022/reducing-lameness-in-irish-dairy-herds.php
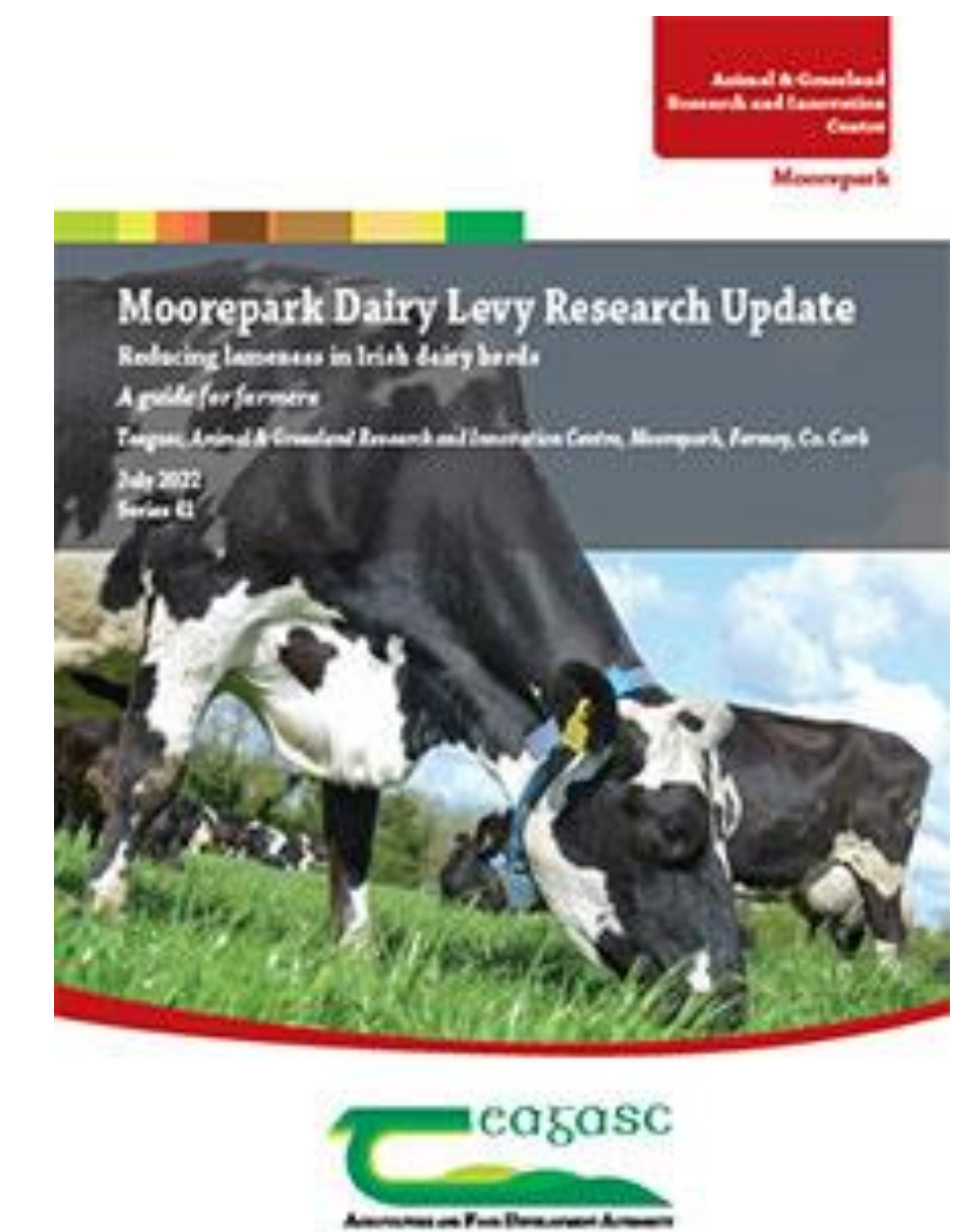
"Routine trimming helped me to reduce the lameness prevalence in my herd, saving me time and money"

Solution 1 – Mastitis detection

Schmit Kelly

Farm Facilitator Luxembourg

Lycée Technique Agricole

Caseus III Workshop international   **29/09/2023**

Dairy Sector in Luxembourg

Year	1970	1980	1990	2000	2010	2016	2017	2018	2019	2020	2021	2022
Farms	5501	2984	1822	1159	810	694	680	662	638	620	603	589
Milk cows	62049	67830	58840	48607	45008	51025	52701	52645	53947	54536	54828	54971
Production (1000 t)	210.9	270.1	281.7	264.5	295.3	376.2	387.2	407.6	421.3	447.3	443.3	449.0
Milk price (€/kg)	0.12	0.19	0.37	0.32	0.30	0.28	0.35	0.34	0.34	0.35	0.37	0.51

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Resilience 4 for Dairy

Lycée Technique Agricole
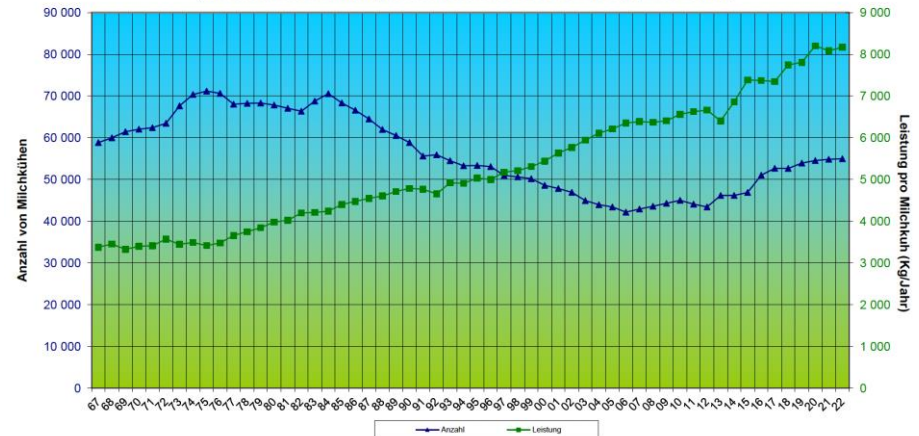
Dairy Sector in Luxembourg

No milk quota since April 2015:

- **Number of farms decreased**, but the average number of cows per farm increased to 93 in 2022 (cf.: 66 in 2015)

- **Number of cows increased**, + 8.000 → 54.971 cows in 2022

- **Number of cows milked in a milking robot has doubled**, > 22.000 cows in 2022

- **Milk performance increased**, +700kg → 8.167 kg/cow/year in 2022

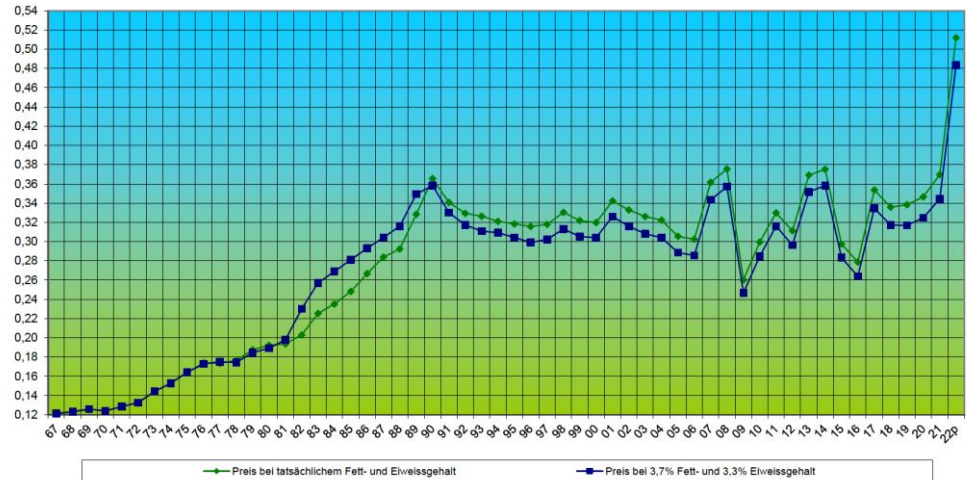Anzahl von Betrieben mit Milchkühen seit 1967
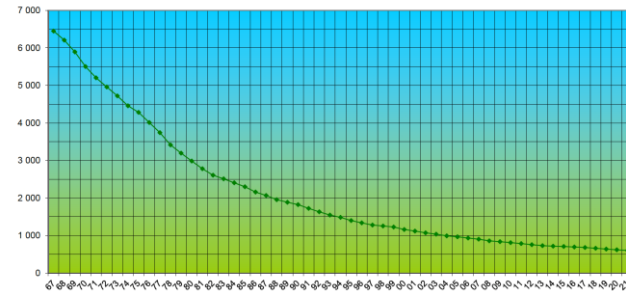
Anzahl und Leistung der Milchkühe in Luxemburg seit 1967

Dairy Sector in Luxembourg

- **milk price:** very fluctuating

- **in 2022 0,48 €/kg** for milk with

  3,7 % fat and 3,3 % protein

- Main dairy is **LUXLAIT**:

  all kind of milk products

- Large part of the milk produced

  is exported

  (e.g. ARLA, Hochwald)

Milchpreis in €/kg seit 1967
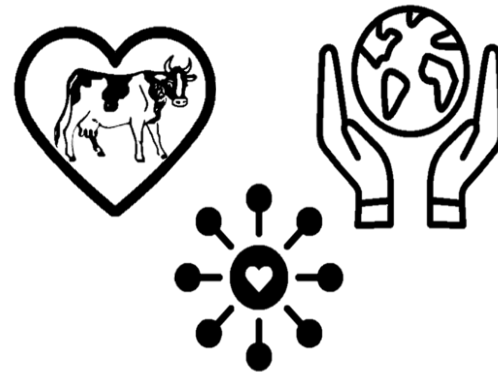
Solution 1 – MASTdecide

Challenges detected:

- development and spread of antimicrobial resistance

- the major proportion of antimicrobials is applied for the treatment of udder inflammation (68%)

Solution:

- Reducing the use of antibiotics in the dairy production

- Optimization of antimicrobial usage in dairy production

- Detect mastitis pathogens quickly and treat them correctly with MASTdecide

Positive impact on:

- Animal welfare
- Environnement
- Society friendly

Solution 1 – MASTdecide

- **Mastitis** is probably the best-known udder disease

- The **cell content** provides information about udder health

  → Determination of the germ type

  → Decision on treatability

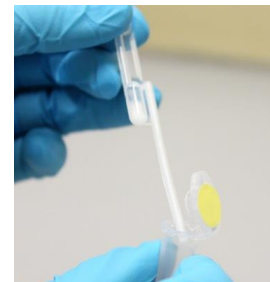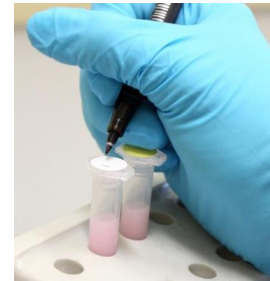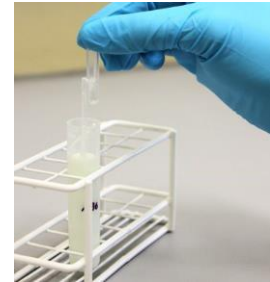MASTDECIDE = Decision Tool for selective treatment

Solution 1 – MASTdecide

Suspicion of Mastitis

- **Sampling:**

  - Collect a quarter foremilk sample

- **Implemention:**

  - add 0,1 ml milk to each of the 2 MastDecide test tubes

  - Place the test tubes in the preheated incubator for 12 hours (37°C)

Solution 1 – MASTdecide

Evaluation of the color of the two test media (3 cases)

No pathogen detected

No additional measure

Gram-negative or coliform

No additional measure

Gram-positive

Local antibiotic treatment

Solution 1 – MASTdecide

COSTS   VS.   POSITIVE Features

package MastDecide:

- 101,15 € for 10 tests

Additional material needed:

- Incubator 37 °C for 94,01 €
- Reaction vessel stand for 26,78 €
- Disposable gloves

- Quick results on the farm
- pathogen-specific therapy selection
- Saves up to 60 % antibiotics
- Reduces antibiotic use, costs and milk losses
- For the benefit of animal health and public welfare

Solution 1 – MASTdecide

Conclusion

- Fast and correct measure without useless use of antibitotics

- Helps to make a decision

- occasionally send samples to the lab for testing to better assess the farm situation

- The whole thing would be really innovative if it were integrated into milking robot technology in the future

Thank you!