Global Methane Genetics initiative

Dairy Working Group

Organisation: Birgit Gredler, Rasmus Bak Stephansen, Raffaella Finocchiaro

October 27, 2025

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Welcome!

- Aim
  - Update what’s happening in Global Methane Genetics
  - Network building
  - Share: knowledge & hurdles
  - Discussion: gaps & needs

Agenda

- Update from GMG (Roel)
    - data sharing & data base development
- Update from the GMG dairy projects (Brown Swiss, Red dairy breeds, Jersey, Holstein IT-PL, Holstein DK-NL) – (project leaders)
- Update ICAR Feed&Gas wikipage (Chantal)
- Update sniffer SOP/testing center for methane recording devices (Chantal)
- Update Projects outside GMG (all)
- Open discussion about research gaps (all)
- AOB

Global Methane Genetics initiative

Investment of 27M US$
25 countries, 50 partners, 25 breeds
Methane pheno- & genotypes ~110k cattle & sheep, ~20k microbiome

Dairy:
Holstein (~42k)
Jersey (~8k)
(Nordic) Red Breeds (~7.3k)
Brown Swiss (~3.3k)

Beef:
North America (~6k)
Australia, Ireland, UK, NZ (~18.5k)

Develop protocols
Phenotyping
World-wide sharing
Genetic evaluation

Sheep: world-wide reference population
Australia & New Zealand
UK & Ireland
Uruguay (~17k)

Africa
Local breeds & crosses (~4k)

Latin America
Beef (~7k)

Microbiome:
World-wide reference population (~20k samples)

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BEZOS EARTH FUND

Global Methane Hub

Update GMG

- Startup meeting Innsbruck
- Second newsletter [1)].

- Contracts
- Proposal development: small holder farms, Asia & buffalos
- Framework of adoption & incentivization system for genetic selection as methane mitigation tool

[1)] Sign up: https://www.wur.nl/en/project/global-methane-genetics-initiative.htm

GMG data sharing & data base

- Two data sharing agreements: 1) GMG paid data and 2) exchange for record contribution. Will be sent for signature to partners
- Database
    - Business requirement and review existing database
    - June three offers to build August contracted, weekly meetings, tomorrow consultation meeting

    →planned delivery February

Architecture & Data Flow

User upload Via SharePoint: 1 → 2

User upload Via Web: 7 → 8

Data processing: 3 → 4 → 5 → 6 → 9

Landing DB

- ✓ Storing a copy of imported files
- ✓ Validate & cleanse data

Data Warehouse

- ✓ Centralized methane data store
- ✓ Keeping historical version of data records
- ✓ MiXBLUP integration
- ✓ Contribution score

Data Mart (Contribution Score)

- ✓ Dedicated database for data extraction

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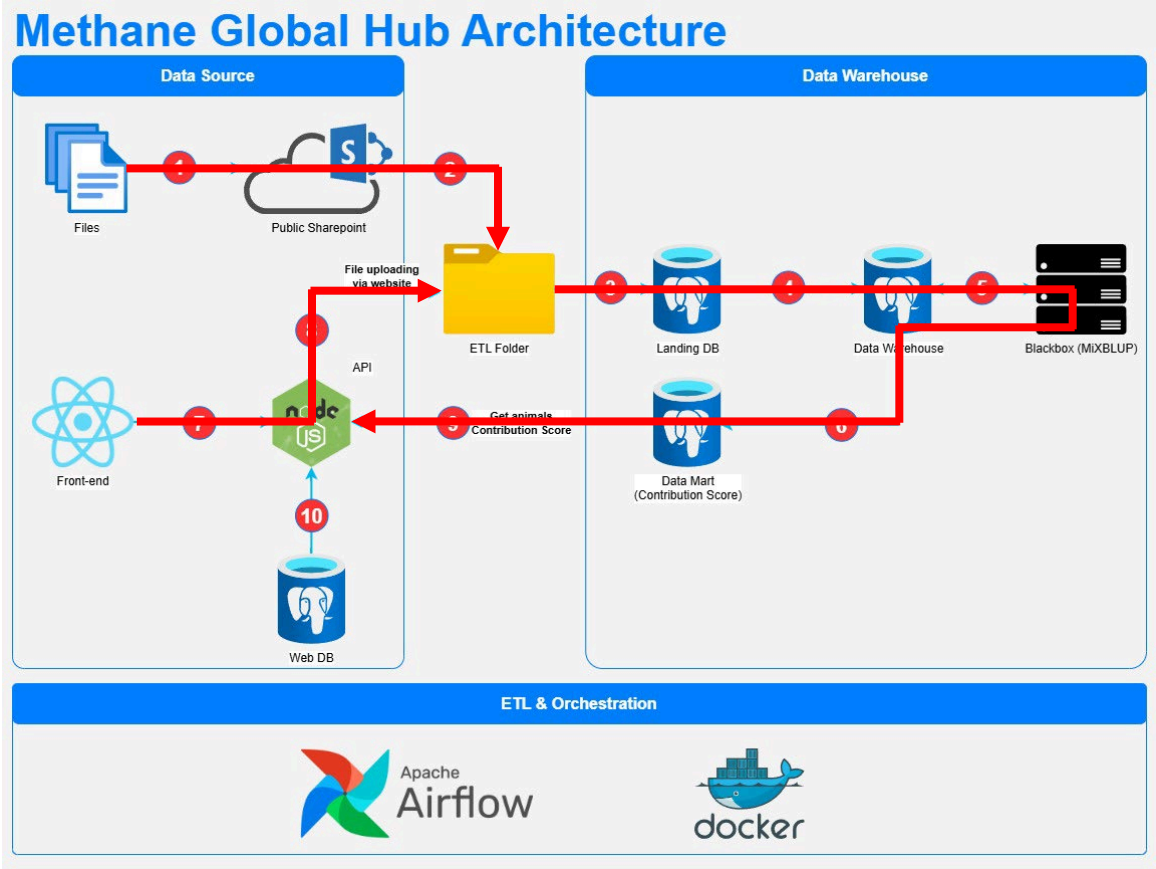


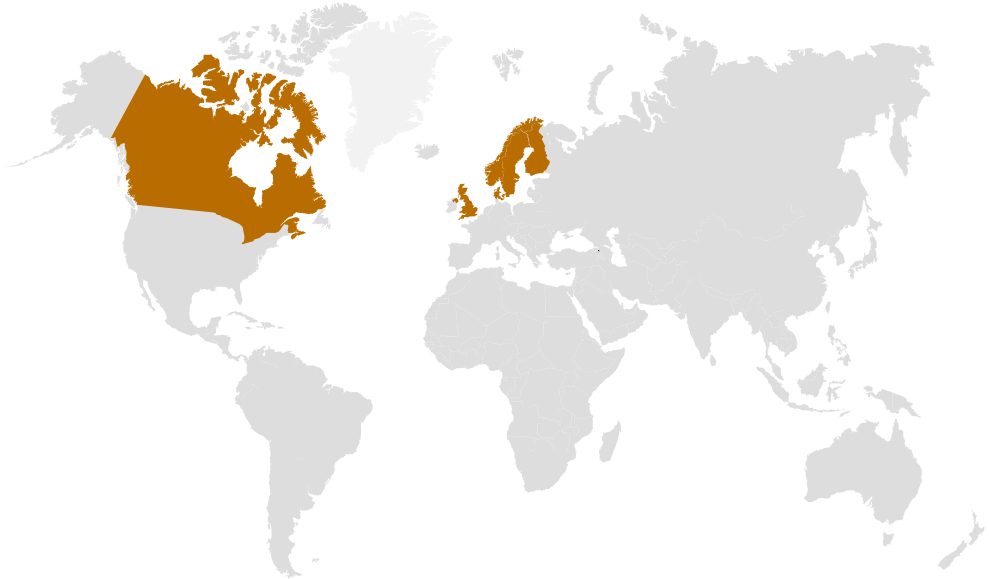
Update GMG Dairy projects

- EMBRACE-BS (Robin Joest)
- Red breeds (Elisenda Rius-Vilarrasa)
- Jersey (Rasmus Bak Stephansen)
- Holstein IT-PL (Raffaella Finocchiaro)
- Holstein DK-NL (Coralia Manzanilla-Pech)

Status Update on: **EMBRACE-BS**, part of:

- Project Agreement and in-kind MTA´s
- Negotiations with third parties regarding microbiome samples
- Start of phenotyping: Delivery of the sniffers is delayed (Tecnosense)
- Farm acquisition and promotion of the project

Mitigating Methane Emissions in Red Dairy Cattle through Genetic Selection



Elisenda Rius-Vilarrasa, Sofia Nyman, **Tomas** Klingström (SWE),
Bjørg Heringstad & **Karoline** Bakke (NOR),
Trine Michelle Villumsen & **Rasmus** Stephansen (DNK),
Enyew Negussie (FIN),
Filippo Miglior, **Christine** Baes & **Debora** Santschi (CAN),
Mike Coffey & **Raphael** Mrode (UK)

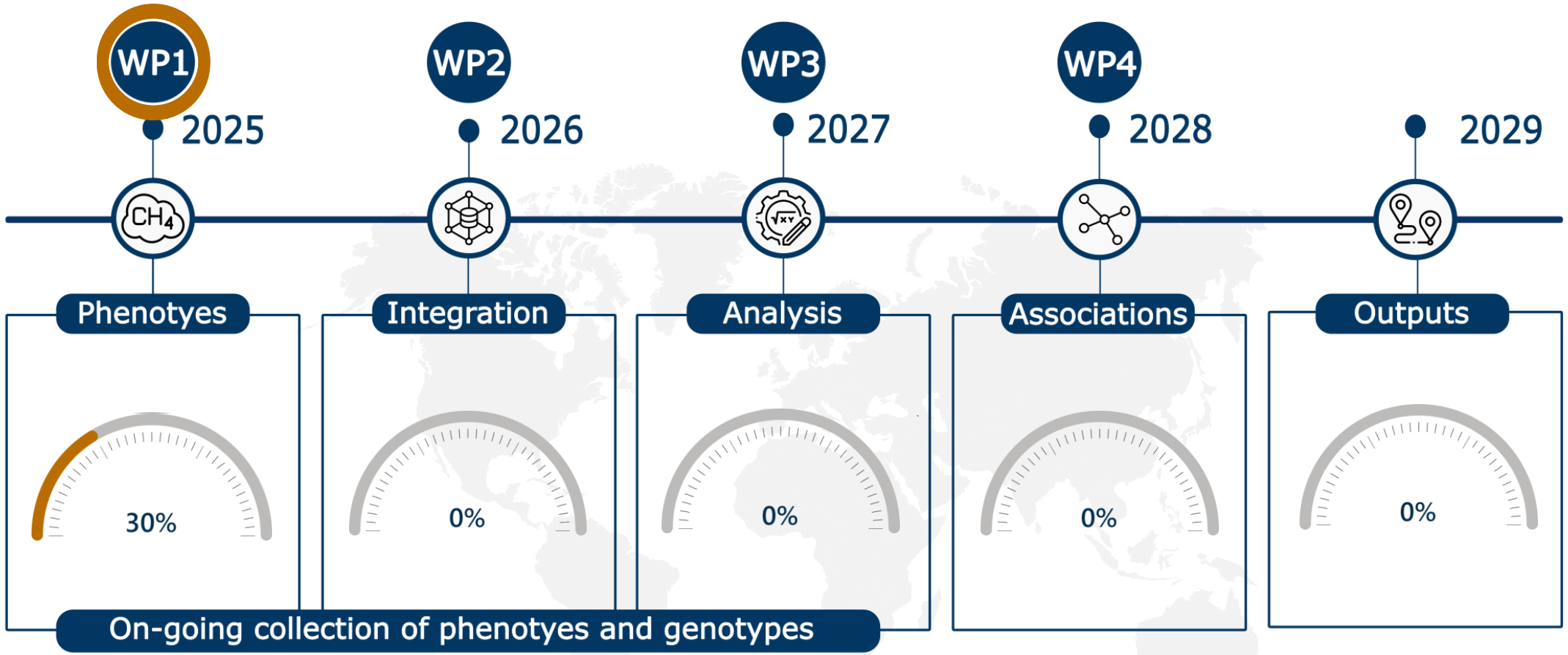
Phenotype & genotype collection

- Funding allocation
- Purchase of sniffers
- Installation of sniffers
- Monitoring and data collection

Phenotype & genotype collection

Progress as of 27 October 2025

Funding allocation	70%
Purchase of sniffers	10%
Installation of sniffers	0%
Monitoring and data collection	0%



GMG redD

Mitigating Methane Emissions in Red Dairy Cattle through Genetic Selection

VÄXA

Global Methane Genetics - Jersey

“Accelerating methane mitigation for Jersey dairy cattle world-wide, through high throughput phenotyping and breeding”

By ChatGPT

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Update GMG Jersey

Waiting for donation, to start equipping herds with sniffers

- Ordering 6 sniffers for Canada and 10+5 sniffers for Denmark

Prepare rumen sampling (application to authorities, talk with farmers on their opinion)

Prepare dissemination in 2026

- ICAR/Interbull 2026
- WCGALP 2026
- Webinar and articles through World Jersey targeting breeders and stakeholders

We see interest from new countries to install hardware to measure CH_4

GMG:
Accelerate data collection on GHG emissions in two European milk-producing countries

Raffaella Finocchiaro (ANAFIBJ) & Marcin Pszczola (PFHBiPM)
Project Leaders

Partners italiani
Francesco Tiezzi – University of Florence
Giulio Visentin – University of Bologna
Maddalena Zucali – University of Milan

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your COW our FUTURE

POLISH FEDERATION OF CATTLE BREEDERS AND DAIRY FARMERS

UNIVERSITÀ DEGLI STUDI FIRENZE

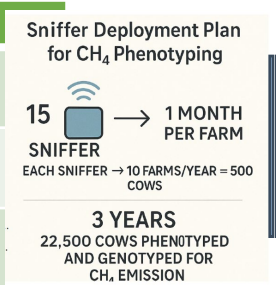
UNIVERSITÀ DEGLI STUDI DI MILANO

ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

your **COW** our **FUTURE**

1

Project target in 3 years	
N° animals	22000 (Italy + Poland)
Device	Sniffer (Moologger)
Microbiome	1500



1. Italy ordered 5 sniffers– 15/11/25
2. Poland order in progress 10 sniffer

2

Internal data-share agreement ready to be signed:
Polish Federation, University of Florence,University of Bologna, University of Milan

3

- Pipeline development in progress: still some doubting on data saving
- Agreements AMS company running (TDM/DeLaval/Gea ---Lely in progress

4

Italy Farms recruiting	
Farms	33
Filter 1	Genotyping/AMS
Filter 2	Known by classifiers

Nowadays we are already working with 7 extra-MooLoggers with a total of **300** cows phenotyped and genotyped

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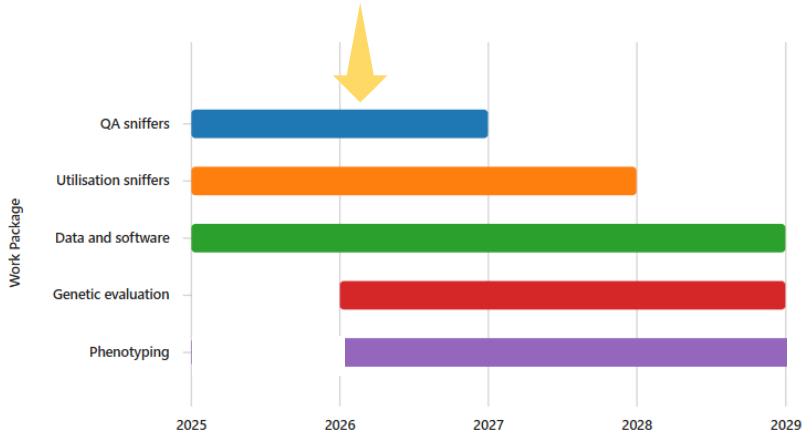
International collaboration developing standards and quality control measures for phenotyping with a used in breeding programs, and accelerating the phenotyping

Trine Villumsen, Coralia Manzanilla-Pech, Yvette de Haas, Roel Veerkamp, Viktor Milkevych, Mogens Lund, Chantal van Gemert, Birgit Gredler-Grandl, Anouk van Breukelen, Rasmus Stephansen, Johan Snijders, Martin Bjerring.



Highlights

- Kick-off meeting 22 September with all parties
- WP1 (WUR)
  - SOP ready and available (11 sniffers)
  - 5 sniffers installed in 2 research farms
- WP2 (AU)
  - Working on a manual for installation of sniffers in AMS (plan to include WUR experience)
- WP3 (AU)
  - GEDA software to align and process CH4 data ready (to be tested in WUR data)
- WP4 and WP5 (WUR-AU)
  - Planning meetings with all parties to discuss strategies, workplan, etc.

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Ministerie van Landbouw, Natuur en Voedselkwaliteit

150 YEARS CRV BETTER COWS > BETTER LIFE

VIKINGGENETICS breeding for what truly matters

AARHUS UNIVERSITY

ICAR Feed&Gas wikipage

- https://wiki.icar.org/index.php/Section_20_%E2%80%93_Methane_Emission_for_Genetic_Evaluation
- GreenFeed
- Wearables
- Microbiome protocols coming soon
- Activities: https://wiki.icar.org/index.php/Section_20:_Activities
- Activities – send us information about projects & events to be included here!

Global Methane Genetics initiative
Testing centre for methane recording devices
Standard Operating Procedures (SOP) - Sniffers

Yvette de Haas, Chantal van Gemert, Lisa Büttgen

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Global Methane Hub

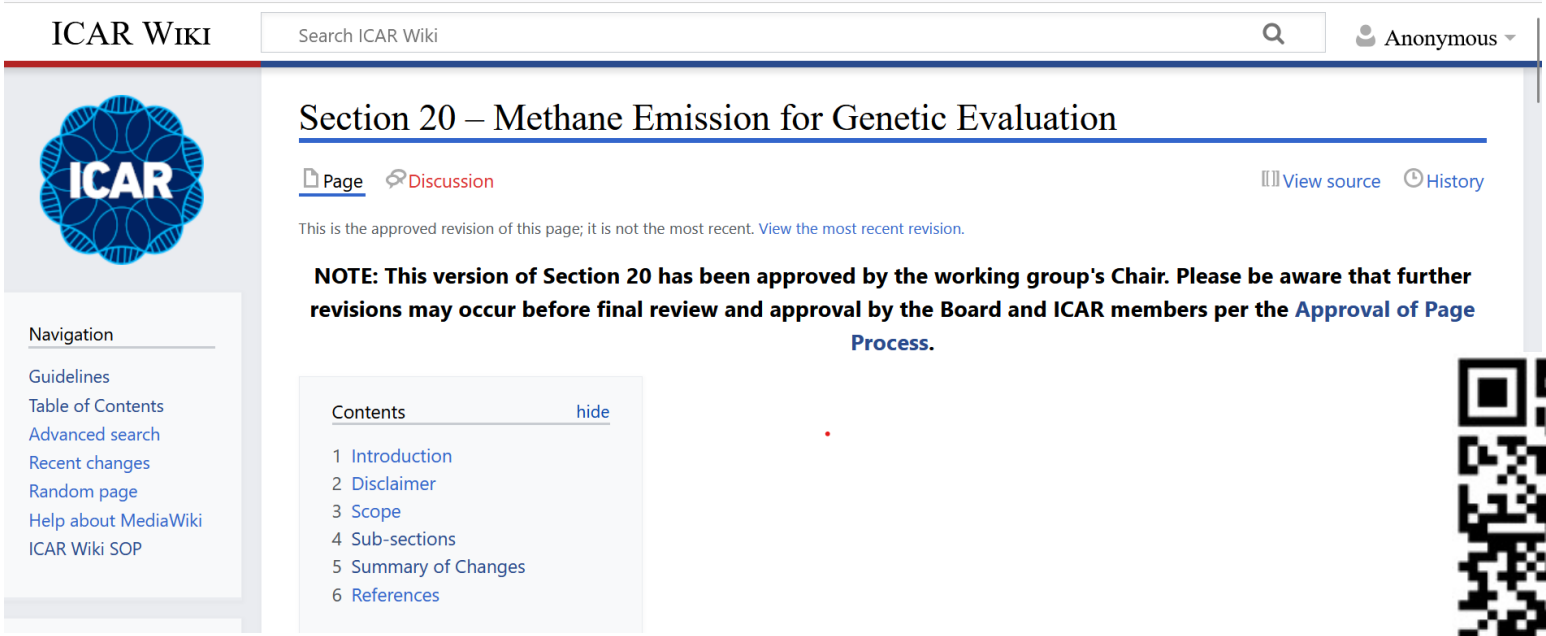
Develop protocols for methane recordings

- Establishing quality standards for **sniffers** and setting up test facility (lab and on farm) for different sniffer types that will serve as guidelines when starting to collect methane records
    - Compare specifications of commercially available sniffers
    - Calibrate and validate a few of these in our Air Quality Lab
    - Set up a test facility on farm with different sniffer types
    - Validate these sniffers against the lung method* and a GreenFeed
    - Set up protocol for methane recordings with a sniffer device

* https://edepot.wur.nl/536449

Specifications on ICAR Wiki

ICAR Wiki: https://wiki.icar.org/index.php/Guidelines



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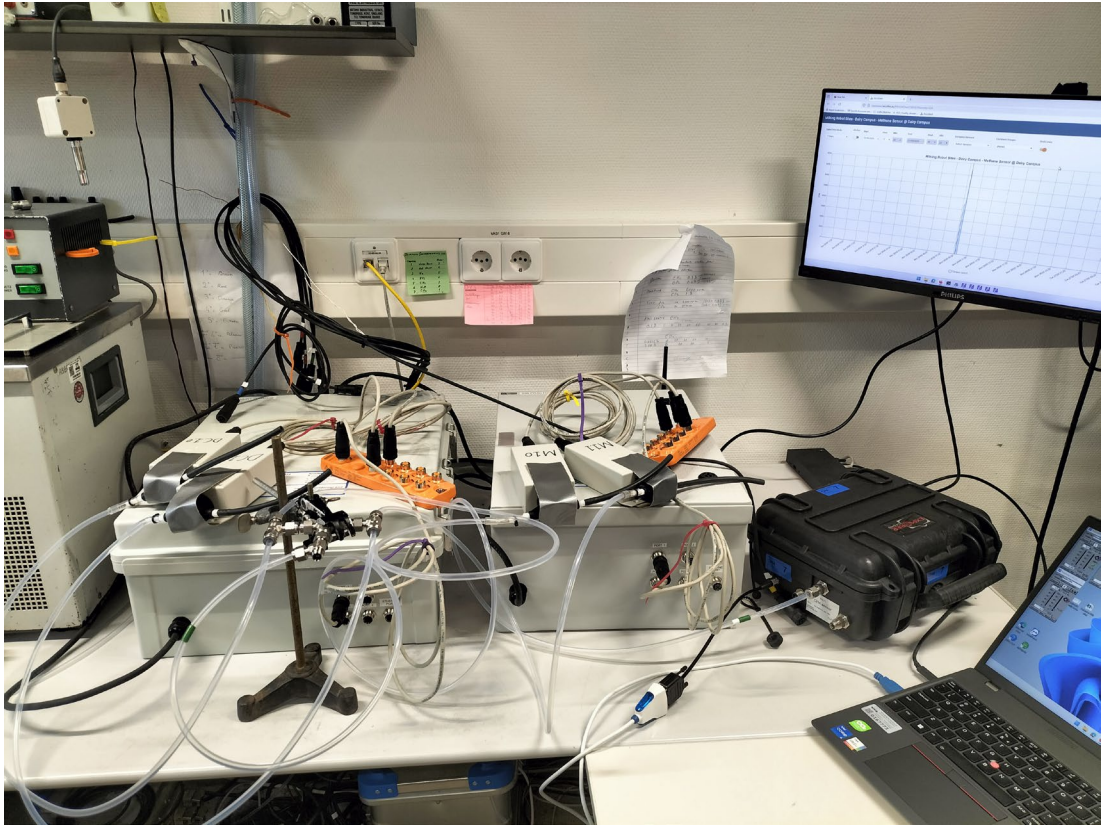
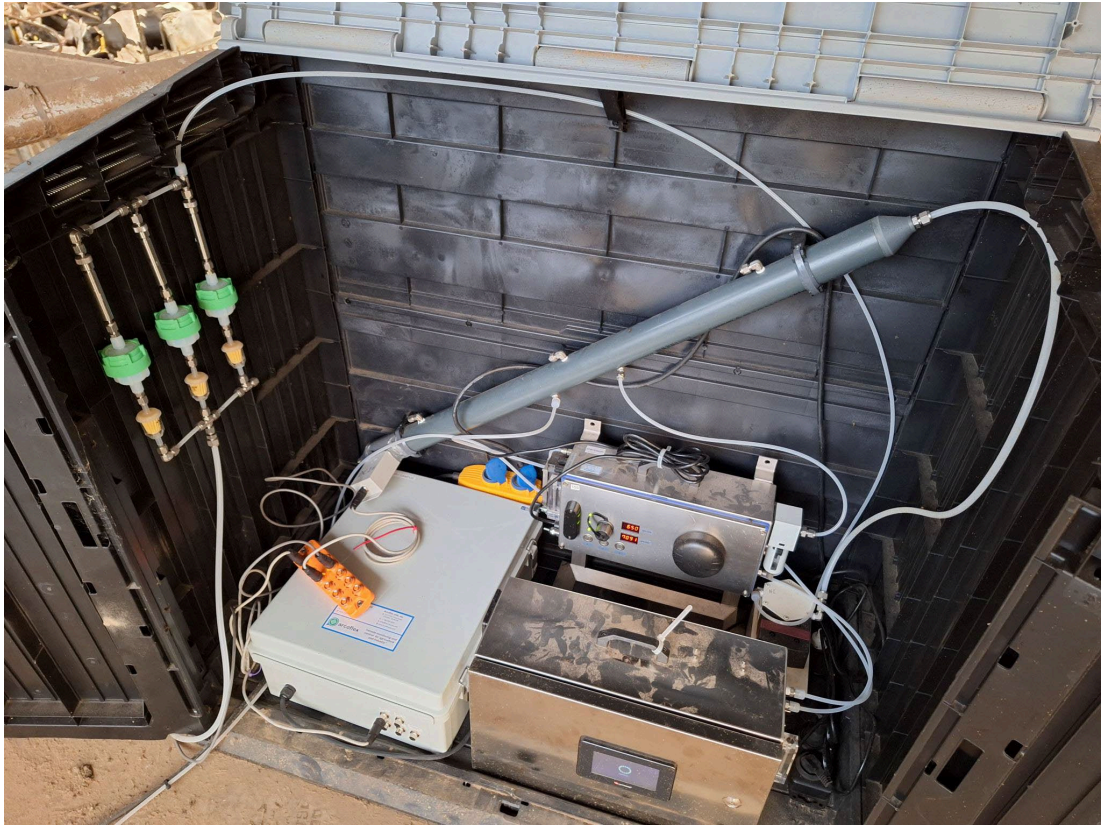
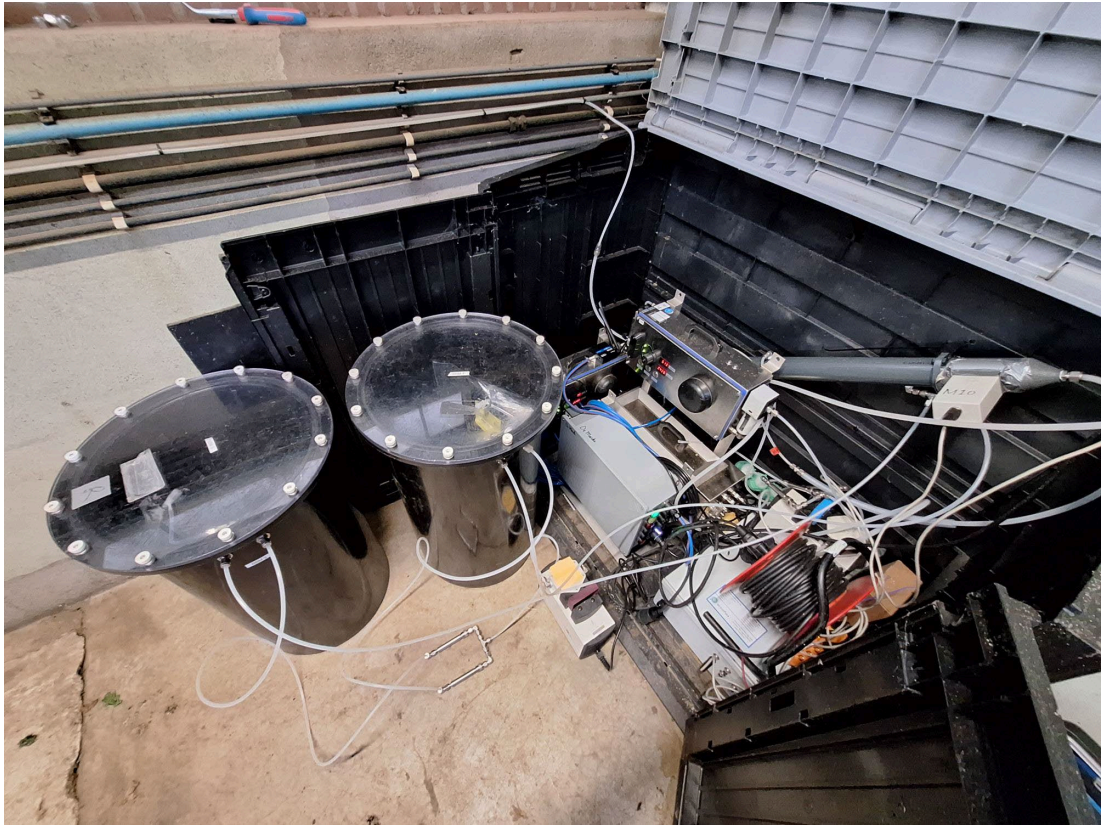
Set up lab facility



Set up on farm facility



Set up lung method (= Gold Standard)



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https://edepot.wur.nl/536449

ICAR test facility

- First for sniffers
- Later maybe also for other methane devices?
- ICAR Board meeting early November 2025

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ICAR Validated Sensor Systems

Beyond official milk recording, obtained with ICAR certified devices, results from devices also supports farm management by providing insights into production, animal health, welfare, and sustainability, often enhanced by mathematical models and algorithms. Given the diversity of applications, a single evaluation protocol is impractical; instead, ICAR offers claim validation for solutions outside official milk recording to ensure user trust while allowing flexibility in development.

ICAR validation ensures that a device (e.g. milk meters for cows and sheep/goats, automatic milking system (AMS) device, milk analysis device, on farm at/in line milk analyzer, sensor device) meets manufacture performance claims through ICAR-approved test plans conducted by a qualified ICAR Test Center.

Successful validation confirms that the system can reliably deliver quality data when used correctly, leading to the award of an **ICAR Certificate of Validation**.

Apply now

Submit the application form to request a validation now.

Application form

The application form should be accompanied by the requested documentation:

- Clear description of all components of system – ID, components, software, etc.
- System technical manual
- Farm operator manual
- Internal research and validation studies
- Peer reviewed publications
- Software manual for use of the system devices
- Installation procedure
- Routine test or periodic checking procedures for service technicians
- Technical characteristics, drawings and 2D/3D pictures of the device

Validation procedure

1. The applicant submits an application form
2. The application is reviewed, and the Test Centre is designated.
3. The Test Centre prepares the test plan, detailing the timeline and associated costs.
4. ICAR provides the applicant with an umbrella contract and invoice for test fees, along with the test plan.
5. Testing begins upon signing of the contract by the applicant and full payment of the test fees.
6. Upon test completion, ICAR disseminates the report to the MRSD Sub-Committee for review, comments, and recommendations.
7. ICAR forwards the report to the applicant and issues the official ICAR Certificate upon successful completion of the test.
8. The certified device/system is listed on the ICAR website.

Thank you for your attention!

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What’s happening in dairy – other projects/initiatives

Open discussion – research gaps

- Trait definition – ratio trait? Which trait in the breeding goal? Challenge inclusion methane in breeding goals
- GxE feed additives
- Beef on dairy
- Genetic correlation between methane & feed intake/efficiency
- Measuring methane in young (heifer) animals
- Software QC, data editing

Thanks for your attention & contributions!

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Newsletter:

https://www.wur.nl/en/project/global-methane-genetics-initiative.htm?wmstepid=thank_you