

Global Methane Genetics initiative

Led by



WAGENINGEN
UNIVERSITY & RESEARCH

In Partnership with



BEZOS
EARTH
FUND



Global
Methane
Hub

GMG Africa Working Group meeting

08-05-2026

Agenda

- Welcome
- Open discussion with all
- GMG Africa projects
 - **East Africa:** Raphael Mrode
 - **West Africa:** Habibou Assouma
 - **South Africa:** Giel Scholtz
 - **ICARDA:** Joram Mwacharo
- Update GMG-initiative
- AOB



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Open Discussion with all

What is going on in your group/institute, related to:

- Methane projects beyond GMG?
- Investigating Genotype \times Environment interactions?
- Adoption and incentives for breeding as a mitigation strategy?
- Genetic correlations between methane and other key traits?
-



Updates of GMG-Africa projects

Update GMG

NEW projects & proposals

- **ICARDA:** measure methane in small holder farms in Africa & India
- **Buffalo proposal** (Lead University of Adelaide, Australia, Asian countries & South America)
- **Asia cattle proposal** (Bangladesh, India, Indonesia, and Pakistan)





Share data,
and accelerate genetic progress
to reduce methane emission

Global Methane Genetics Initiative

LOGIN

Please log in to continue to your account.

Email

Password



Remember me

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Log in



For registration, please contact us at methane-register@datagene.com.au

GMG project:

Framework adoption & incentivization system for genetic selection as methane mitigation tool

**Methane
breeding value
validation
protocol**

Webinar
May 11, 2026

**SWOT analysis
trait definition
Selection index
Breeding objective**

Webinar
April 13, 2026

**Review of
policy levers
and market
mechanisms**

Webinar
May 7, 2026

Session at ICAR meeting in Verona: Adoption & Incentives to Breed for Methane Mitigation
<https://icar2026.it/meeting-programme/> & panel discussion

Webinars & WG meetings

Towards guidelines to validate genetic evaluations for enteric methane emissions

Date and time
Monday, 11 May 2026
12:00-13:00h CET

Latin America working group meeting

Date and time
Tuesday, 12 May 2026
16:00-17:30h CET

Beef working group meeting

Date and time
Monday, 18 May 2026
13:00-14:30h CET

Microbiome working group meeting

Date and time
Tuesday, 9 June 2026
12:00-13:30h CET

Webinar planning GMG initiative 2026

Measuring methane emissions using Laser Methane Detection (LMD) in rural livestock systems: key considerations

Date and time
Wednesday 25 March 2026
9:00-10:30h CET

SWOT analysis of methane trait definitions and consequences for breeding programs

Date and time
Monday, 13 April 2026
12:00-13:00h CET

Dairy working group meeting

Date and time
Thursday, 23 April 2026
12:00-13:30h CET

Sniffer data aligning and editing pipelines

Date and time
Wednesday, 29 April 2026
14:00-15:30h CET

Sheep working group meeting

Date and time
Thursday, 30 April 2026
12:00-13:00h CET

Enabling adoption of methane-reducing breeding programs through GHG accounting and MRV frameworks

Date and time
Thursday, 7 May 2026
12:00-13:00h CET

Africa working group meeting

Date and time
Friday, 8 May 2026
13:00-14:30h CET

News
flash*

GMG newsletter:



In person meetings



World Congress on
Genetics Applied
to Livestock Production
Madison, Wisconsin
12-17 July 2026



27th AAABG Conference
23-25 March 2027
Geelong | Victoria | Australia

Genetic Advances through Innovative Next-generation Technology

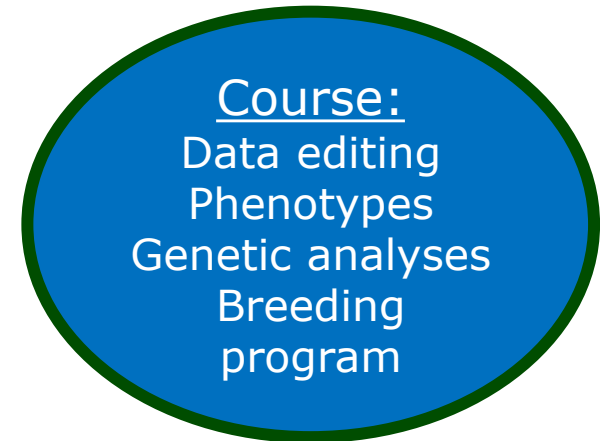


EOI Call for Papers Extended!



Verona, Italy
29 May - 5 June 2026

Shaping the Future of Sustainable Livestock
Let's meet in Verona



Course:
Data editing
Phenotypes
Genetic analyses
Breeding
program



The 77th EAAP Annual Meeting
07/11 September 2026 - Hamburg, Germany



Any other business & closure

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Contact:
gmg@wur.nl



Better lives through livestock

Global Methane Genetics Initiative: Accelerating reduced emissions in indigenous breeds in Africa: Update East Africa Component

R. Mrode -- East Africa Team : ILRI, Nairobi, Kenya

May 8, 2026

Phenotyping

- Phenotyping tools
- A total of six LMDS units have been purchased
 - Kenya and Ethiopia
 - Training of national partners to use the LMD
- 2 GreenFeed units have been purchased but installation was only occurred early this year.
 - Further delay in Ethiopia due to damage to Solar panel



Data Capture

- Using of LMD, CH4 capture
 - 1,137 animals across both countries from December 2025 till March 2026
 - 2,479 measurement events recorded
- Using of GreenFeed Units
 - Initial experimentation and training of animals started in March in Kenya
 - About 40 cows of various breeds and crosses are being measured
 - Training of animals have just began in Ethiopia
- Data storage
 - database designed to receive data



Challenges

- Delay in purchase and installation of data collection equipment.
 - LMD were available for use in November/December
 - GreenFeed units were only installed in mid- January this year.
- Green Feed unit
 - 11 animals are refusing to visit the unit
 - Dominant cows tend to be more frequent
 - More resources are needed
- Rumen sampling
 - Yet to commence






Thank you for
your attention

ILRI

INTERNATIONAL
LIVESTOCK RESEARCH
INSTITUTE



The International Livestock Research Institute (ILRI) is a non-profit institution helping people in low- and middle-income countries to improve their lives, livelihoods and lands through the animals that remain the backbone of small-scale agriculture and enterprise across the developing world. ILRI belongs to CGIAR, a global research-for-development partnership working for a food-secure future. ILRI's funders, through the [CGIAR Trust Fund](#), and its many partners make ILRI's work possible and its mission a reality. Australian animal scientist and Nobel Laureate Peter Doherty serves as ILRI's patron. You are free to use and share this material under the Creative Commons Attribution 4.0 International Licence .

*better lives
through
livestock*

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UPDATE ON PROGRESS

West Africa (UAC, Benin & CIRDES, Burkina Faso)



8 May 2026

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Working on ...

- Assessment of enteric methane emissions and microbial diversity at different physiological stages of Zebu, and taurine cattle (UAC - Benin and CIRDES - Burkina Faso)
 - Three breeds (CIRDES): Sudanese Peulh, Azawak, and N'Dama
 - Five breeds (UAC): Borgou, Lagoon, White Fulani, Goudali, and Somba

What is done ...

- Barn construction (UAC):



- Recruitment of two postdoctoral fellows, 1 PhD student, an engineer, four herdsmen (UAC and CIRDES)
- Development of proposals for data collection (UAC and CIRDES)

- GreenFeed® and SmartFeed® installed, animal purchased and trained (UAC and CIRDES)



Zebu cattle



SmartFeed®



Cow at GreenFeed®

- Equipment purchased and installed (UAC) for data collection



LactoScan



Scale



LMD

- Feed resources installed, purchased and analyzed (UAC and CIRDES)



Fodder plot of *P. maximum* established



Concentrate



Pelleter

What further activities are planned ?

- Cows' heat synchronization and artificial insemination (UAC and CIRDES): May 2026
- Experimental feed formulation (UAC and CIRDES): May 2026
- Pregnancy checking by echography (UAC and CIRDES): May-June 2026
- Data collection starting (UAC and CIRDES): June 2026



Any roadblocks faced or lessons learned ...

- Some cows had ovarian cysts (CIRDES)
- Difficulties in specific animal category (primiparous cows) purchasing (UAC, CIRDES)
- Given that difficulties in acquiring cows, additional cows (Azawak zebu) were ordered from Niger (CIRDES)

What does data collection look like ...

- Animal are still in the adaptation phase (UAC and CIRDES). Data collection using the GreenFeed® will start in june 2026.
- Data collection on cattle breeds using the Laser Methane Detector will begin in june 2026 (UAC).

Thank you

***Global Methane Genetics Initiative:
Accelerating reduced emissions in
indigenous breeds in Africa***

***Southern Africa sub-project: Validation of
methane production and mitigation
strategies for beef production in southern
Africa***

ARC-Animal Production

M Scholtz, G Pyoos, P Soma, F Jordaan, M Mokolobate

University of the Free State

E Casson

Delta D, USA

M MacNeil

Project objectives

- **Validate effect of breed (Afrikaner, Bonsmara, Nguni) on methane emissions & validate the IPCC Tier 2 and Tier 3 estimates with measurements obtained from the Vytelle and the GreenFeed Systems**
- **Genotype some animals to validate the impact of genotypes on methane emissions**
- **Include methane emissions in a phenotypic selection index of biological efficiency for a weaner calf (cow-calf) production system**
- **Compare the rumen micro-biomes of poor with good performing cattle (including methane production)**

Some challenges faced

1. Some animals are not eating the pellets once inside the GreenFeed system
2. Some animals do not stay long enough to get validated measurements
3. Two or more animals push into the system at once which causes errors in the data captured in that moment.
4. Some animals especially the Nguni breed type tends to “dominate” the machine, preventing access by the other breeds.

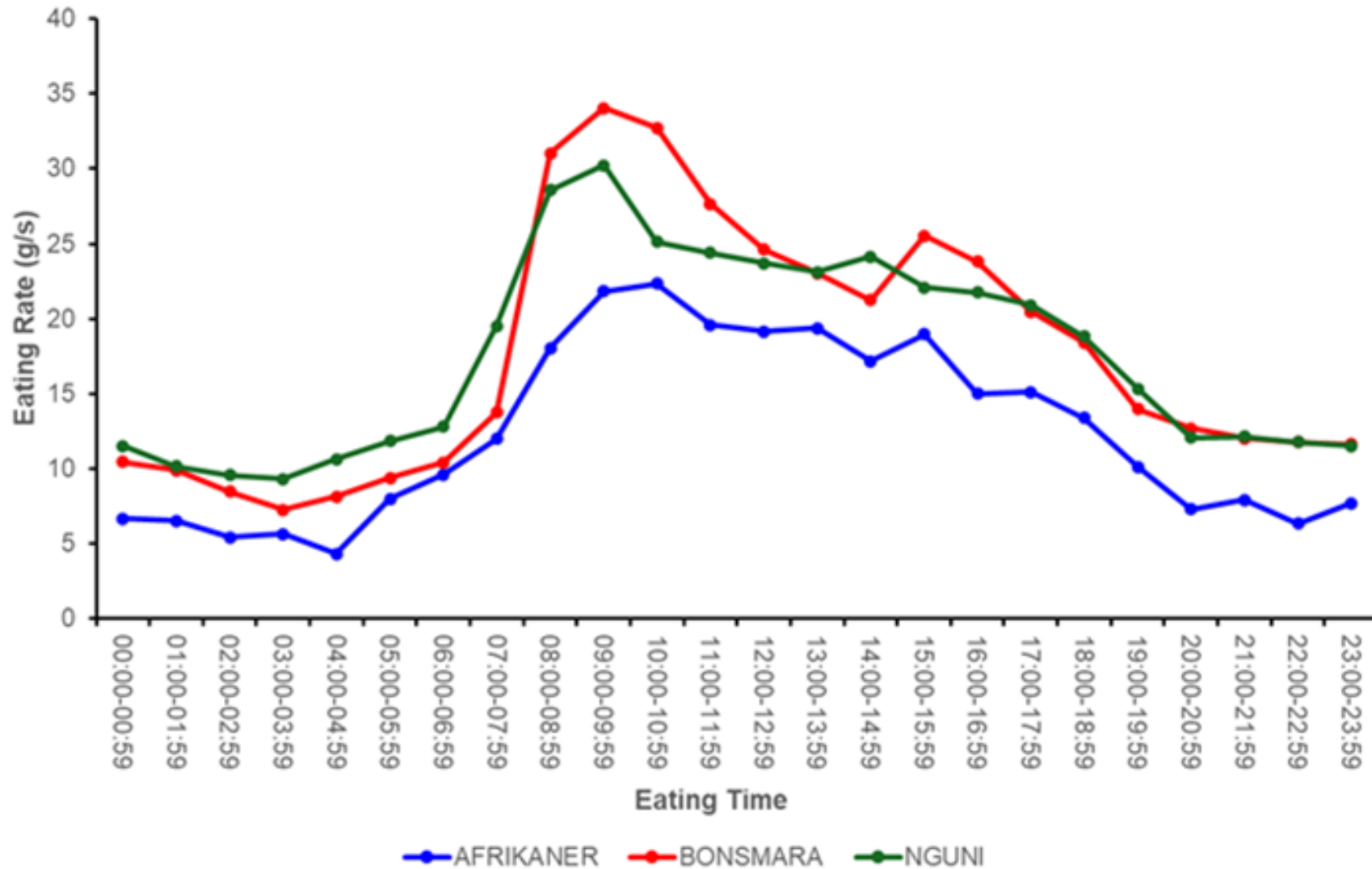
NB: The outbreak of FMD in South Africa limited the number of animals in the current intake for testing

Data collection

- Methane data, feed intake, body weight, hair samples, rumen fluid and faecal samples collect for 14 Afrikaner, 14 Bonsmara & 18 Nguni (fed together) [more animals were tested]
- Methane data, feed intake, body weight and hair samples collected for 14 Brahman & 18 Simmental (fed separately – not part of project)
- Current in test: 14 Afrikaner, 13 Bonsmara & 20 Nguni (just started)

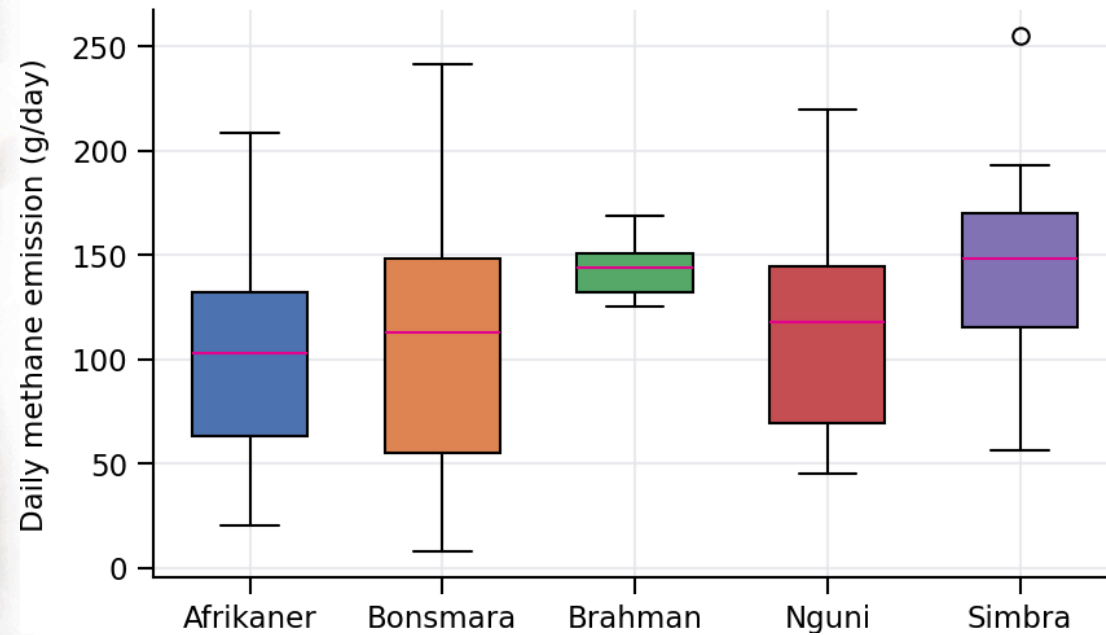


Eating Rate (g/s) as measured by GrowSafe

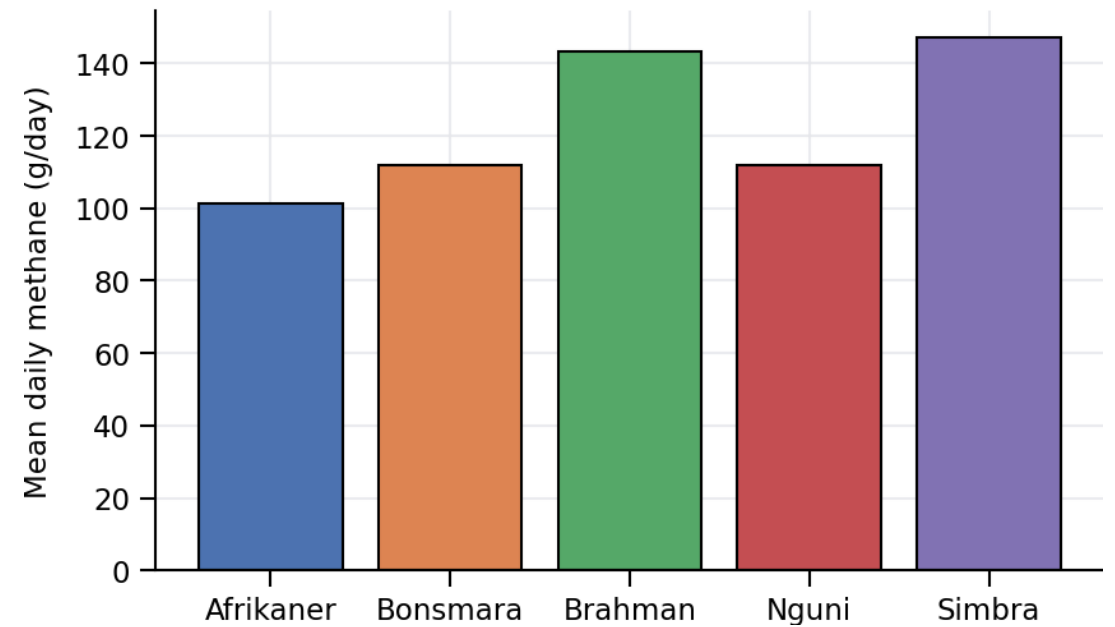


Preliminary results

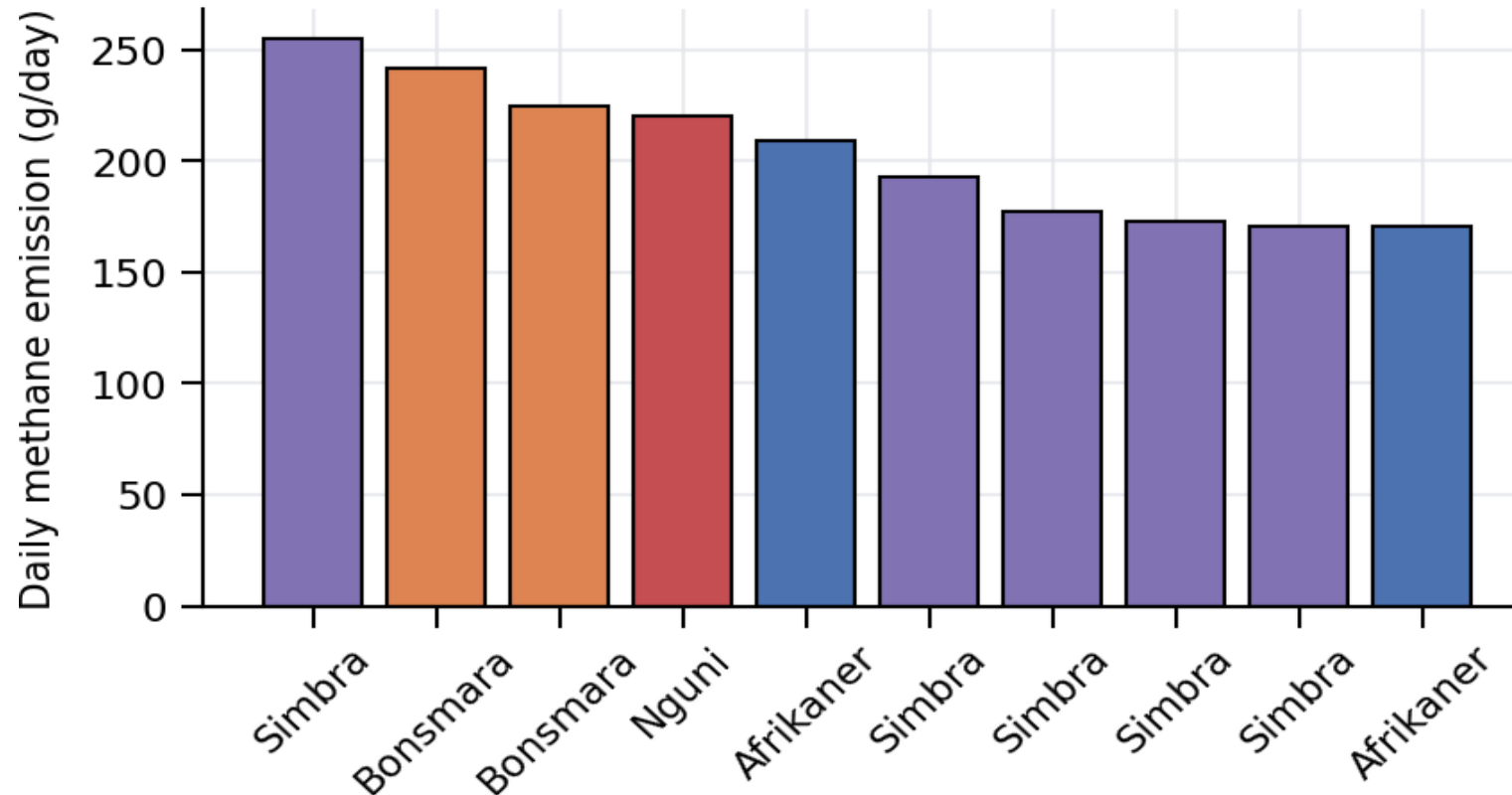
Daily methane emissions by breed



Mean daily methane emission by breed



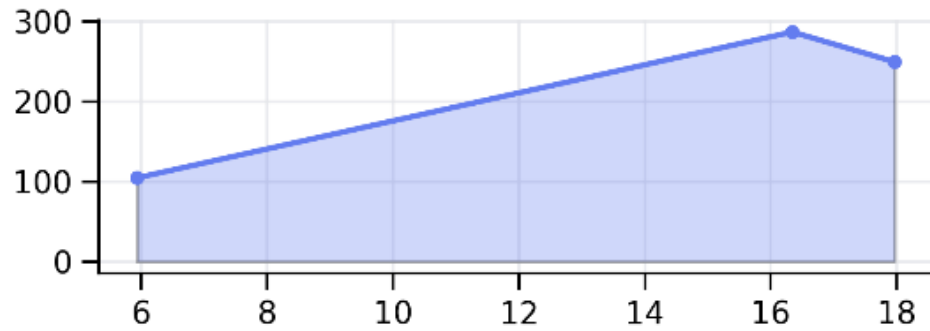
Top 10 methane emitters (by breed)



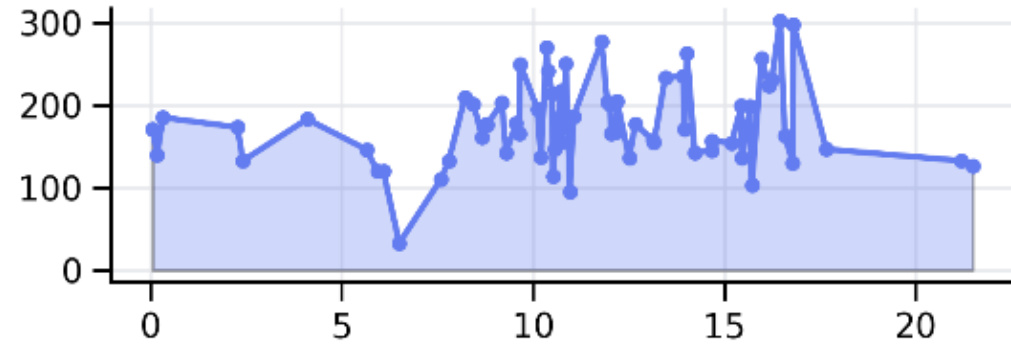
- To be done now:** Rank the animals within each breed from high to low.
1. This will indicate which animals should be genotyped.
 2. Can it be linked with the rumen microbiomes?

Paired Methane-Time curves and Trapezoidal Integration for Afrikaner, Bonsmara and Nguni

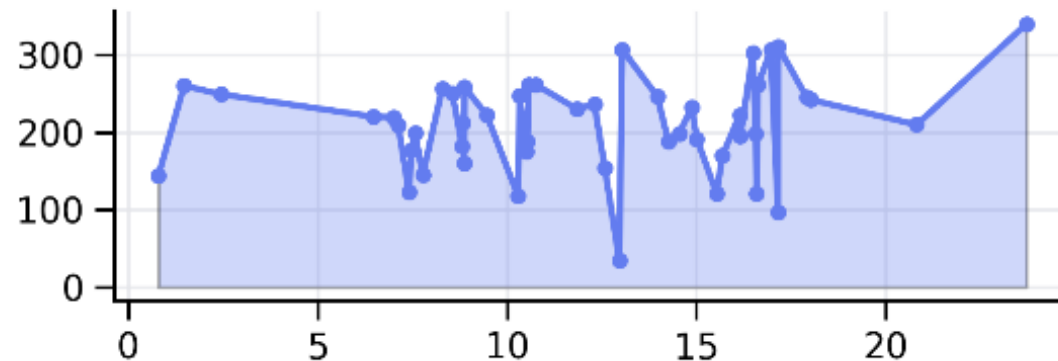
Afrikaner: Integrated Volume



Bonsmara: Integrated Volume

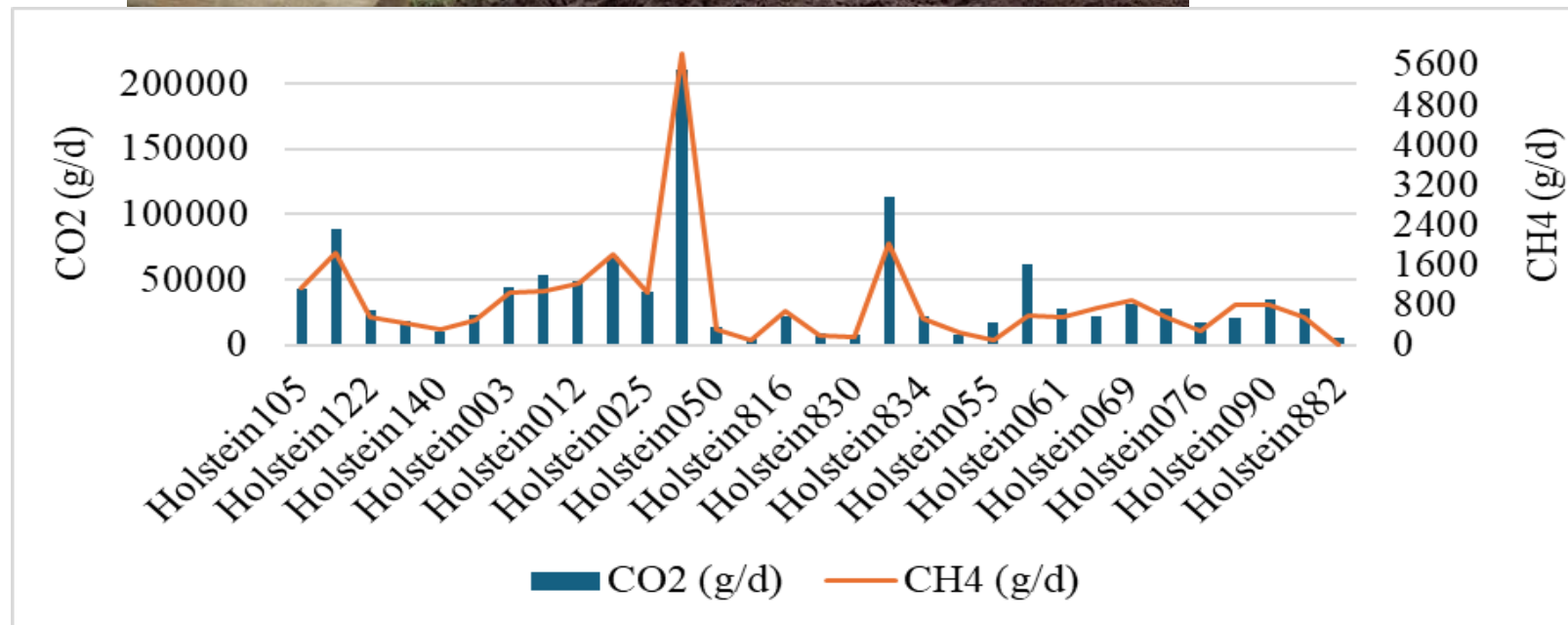


Nguni: Integrated Volume



Other activities

Measurement of methane production from dairy cows (not part of this project)



Other future activities

Measure the actual on-farm methane emissions of beef cattle under sweetveld, sourveld and bushveld vegetation types over a whole production system, from mating until the weaning of the calf.

Indigenous breeds involved:

Afrikaner

Bonsmara

Nguni

Will there be an interaction between breed and vegetation type?



THANK YOU



Expanding low methane genetics to small ruminants in Africa and Asia

Dryland Livestock Genomics - ICARDA, AbacusBio and National Partners



Driving ambition *vis-a-vis* the bigger vision

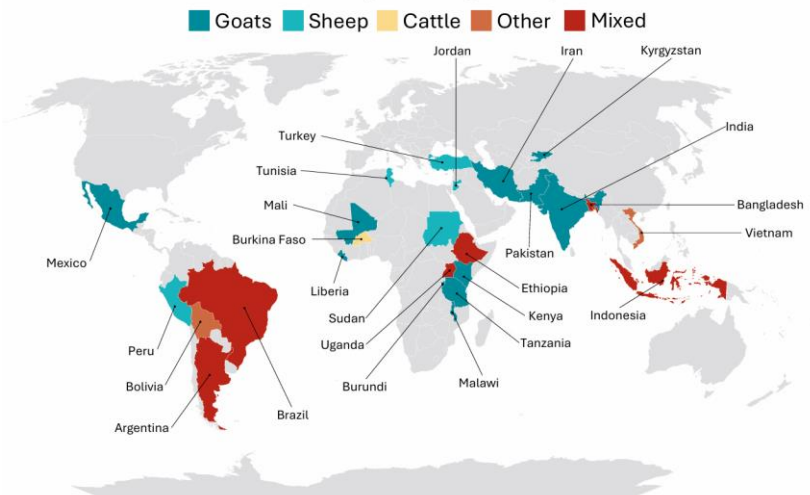
Establishing permanent structures for...

- recording,
- archiving,
- sharing,
- evaluating,
- reporting

... methane emissions data of locally adapted indigenous small ruminant breeds in smallholder systems in LMICs

Anchor platform
Community-Based Breeding Programs (CBBP)

Global distribution of CBBPs by Country and species



Project location, breeds, and partners

Africa

Tunisia

- OEP and IRESA
- Barbarine sheep - Saouef
- Noire de Thibar sheep - Beja
- Mountain goat - South of Tunisia



Ethiopia

- Bonga Agricultural Research Center - Bonga sheep
- Areka Agricultural Research Center - Doyogena sheep
- Arba Minch Agricultural Research Center - Konso goat

Asia

Mongolia

- Research Institute of Animal Husbandry
- Local Mongolia Cashmere goat and sheep



India

- Project Mesha Bihar State
- Nimbkar Agricultural Research Institute (NARI)
- Suwarna sheep and Osmanabadi goats



Objectives and associated work packages



Phenotyping methane emissions in smallholder and pastoral livestock systems in Africa and Asia (Work Package 1; Lead: Aynalem Haile)



Customize the DTREO data platform to include methane phenotyping and develop specific extracts to enable genomic evaluations for methane emissions and other traits (Work Package 2; Lead: Tesfaye Getachew - ICARDA & Bruno Santos - AbacusBio)



Genotyping animals with contrasting methane emission intensities to characterise genomic basis and potential trait variation (Work Package 3; Lead: Joram Mwacharo)



Provide technical backstopping, coordination, foster networking, and deliver targeted training, for effective project implementation (Work Package 4; Lead: Mourad Rekik)



Data, tools and equipment's

- Phenotyping (Objective 1 – WP1)

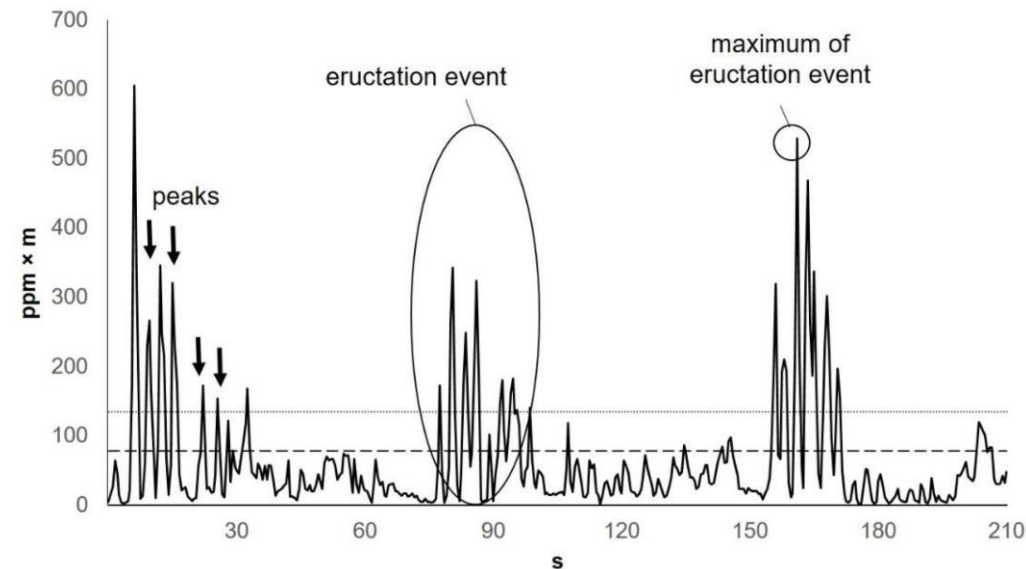
- Equipment

- Laser methane detector (LMD; >10K animals)
- Distance from animal - 1 meter
- Off-feed/grazing - 1-4 hours
- Measurement duration - >5 min/animal
- Once/day across three days per month
- 1, 2, 3rd day or 1st Mon, Wed, & Fri of the month
- Production metrics - liveweights

L-TEK P100



Laser MethaneSmart



Data, tools and equipment's

- Phenotyping (Objective 1 – WP1)

- Equipment

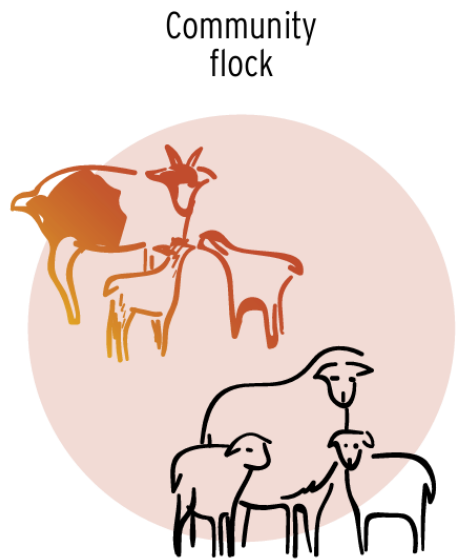
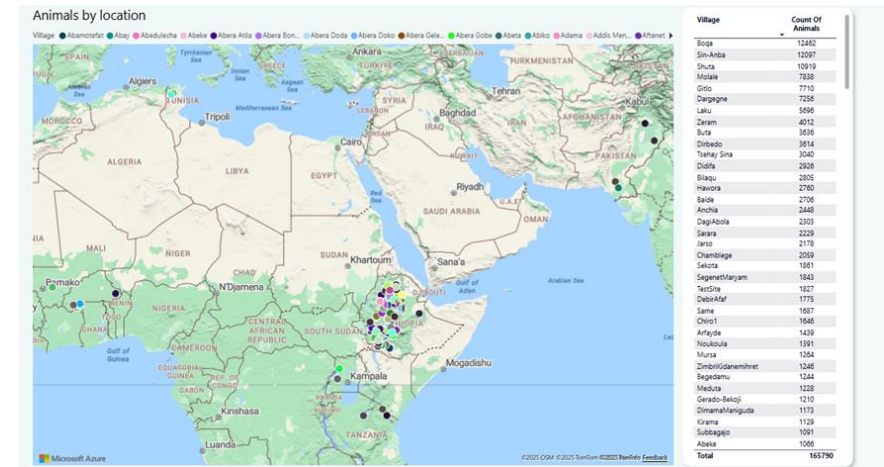
- Portable accumulation chambers (PACs; >3K animals)
- Groups of 5-7 animals per day (target 6 animals/group)
- 1-4 hours off-feed/grazing
- Duration in the chamber 40-60 minutes
- 3 measurements: 10, 30, 50 mins **or** 20, 40, 60 mins

Eagle 2 gas analyzer

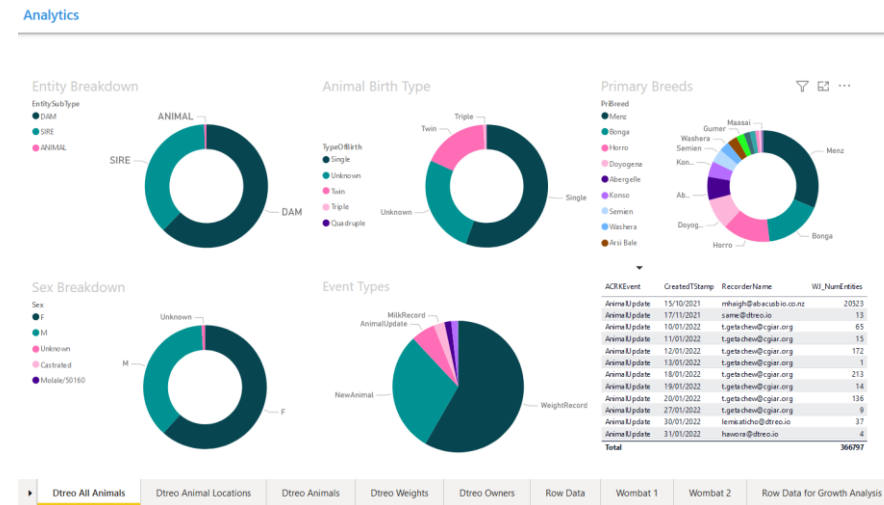
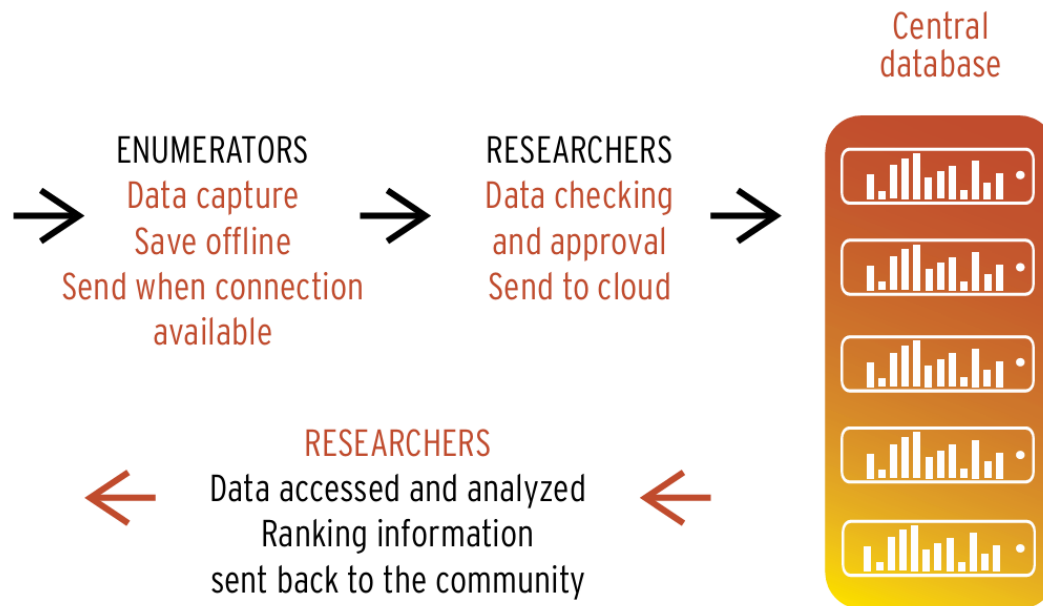


Data, tools and equipment's

- **Data integration into DTREO platform (Objective 2 – WP2)**
 - DTREO: digital data capture, storage, analytics & reporting
 - Manages >160K animals, >130 villages, >6 countries
 - Type of Data: Performance, pedigree, health, environment, geo-location...
 - Avail accurate EBVs and provide quick feedback



Getachew et al 2021



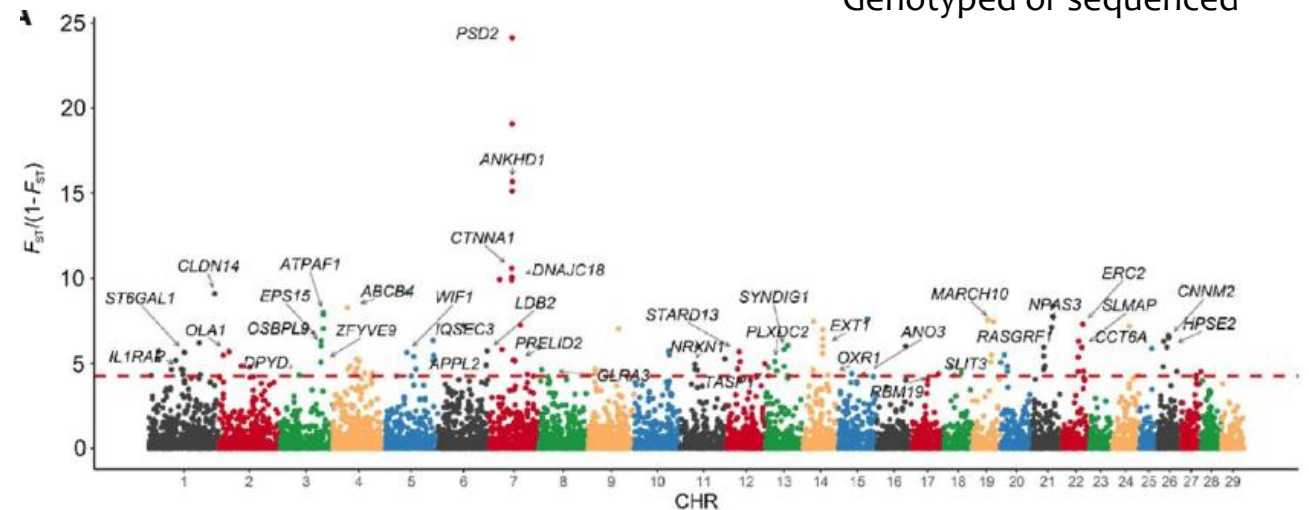
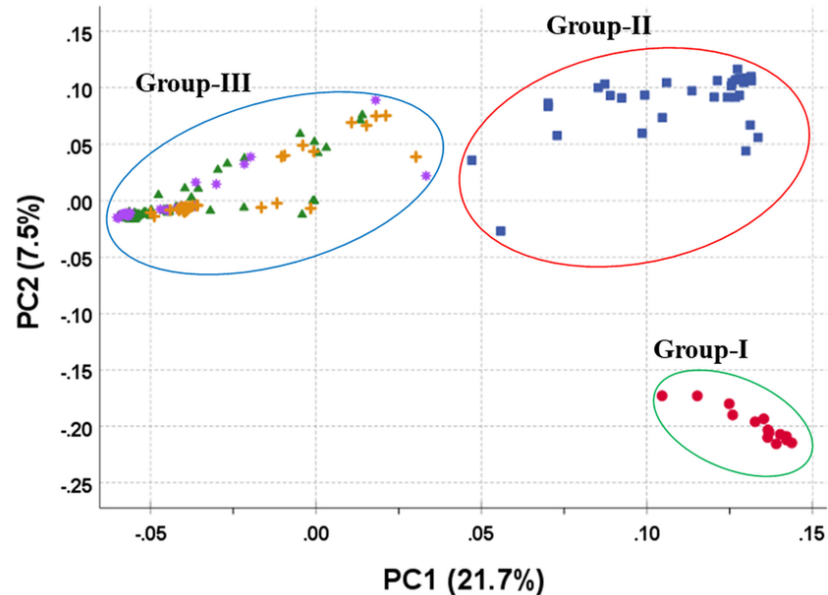
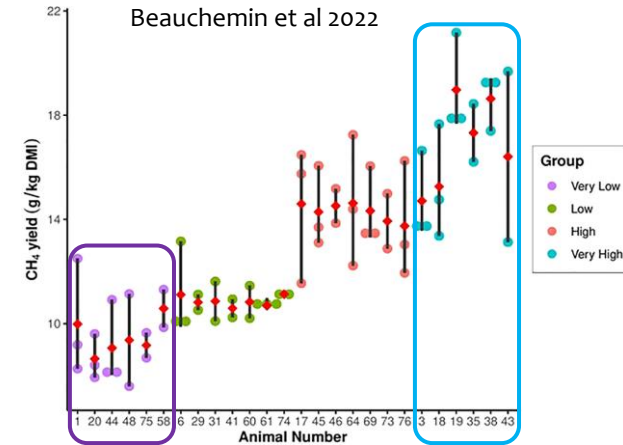
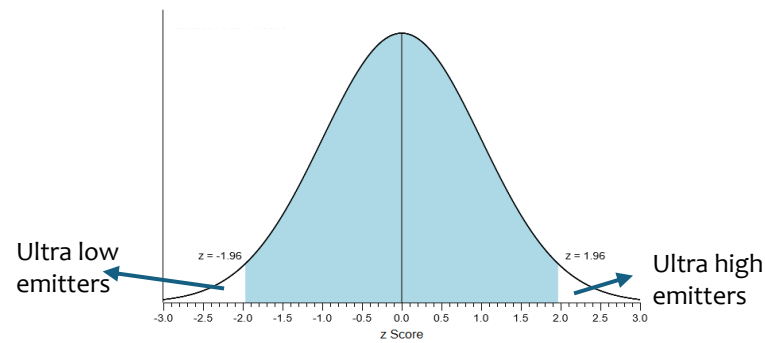
Integrate a methane recording event/plugin into DTREO

Data, tools and equipment's

- Genotyping (Objective 3 – WP3)

- Tools

- 50K ovine and 60K caprine SNP Chips
- Low and high methane emitters
- Selection signatures – F_{ST} , XP-EHH



Ultra low emitters

Ultra high emitters

Genotyped or sequenced

Long-term progression and sustainability

- **Technical support and capacity development (Objective 4 – WP4)**
 - Strengthen capacity of partners to ensure effective and sustainable implementation of the project and beyond
 - Experiential/Practical training – equipment's, technical tools
 - Peer to peer training and exchange of ideas
 - Academic training
 - Advanced training (MSc and PhD) – Can use the data for dissertations
 - Target: researchers, extension staff, livestock farmers and pastoralists



Bumps and rumble strips

- Procurement bottlenecks
- Availability of tools/equipment's

Lessons learnt

- Early purchase
- Avoid procurement in Q4 of the year

Project partners



Mongolia Research
Institute of Animal
Husbandry



Ecole Supérieure
d'Agriculture
MATEUR (EASM)




Areka Agricultural
Research Center

Project Mesha
Bihar State India

Ecole Supérieure
d'Agriculture du Kef (ESAC)

Institute National
Agronomique du Tunis (INAT)





**A day shall come when we will enjoy environmentally friendly
chevron, mutton, milk and cheese**

Thank you



Senior Expert program (SEPII)

Improving productivity and resilience of locally adapted ruminant livestock in Africa while reducing methane emission

Prof. dr. Richard Crooijmans:

WUR, ABG, The Netherlands

richard.crooijmans@wur.nl

Dr. Julie Ojango:

ILRI, Kenya

j.ojango@cgiar.org



Aim

- Select animals for future breeding in community farming systems with:

1. Reduction of methane emission

- a. Measure emission
- b. Whole genome sequence
- c. Rumen microbiome

2. Improve milk components beneficial for human consumption

3. Adaptation to a changing environment

4. High resilience

5. Training

SR-breed selection

Sheep



Red Maasai



Dorper

Goats



Gala



Small East African

Local adapted SR livestock numbers

sheep



| Kapiti Research Station (ILRI) | Baringo county |
|--------------------------------|----------------|
| 70 | nd |
| 30 | 100 |
| 100 | nd |
| nd | 100 |



Sampling
200 local animals



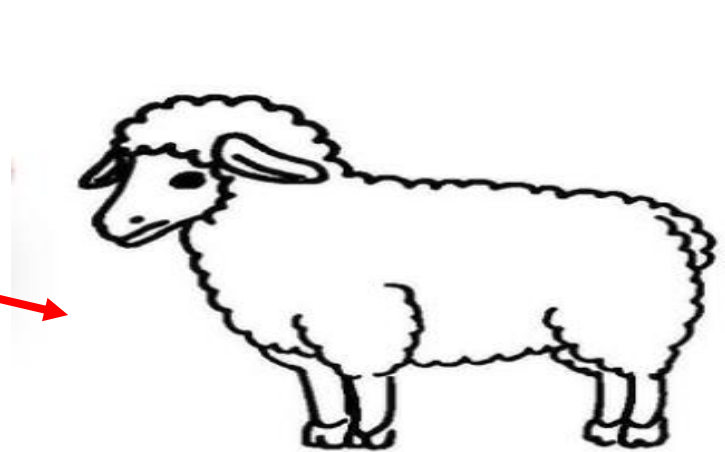
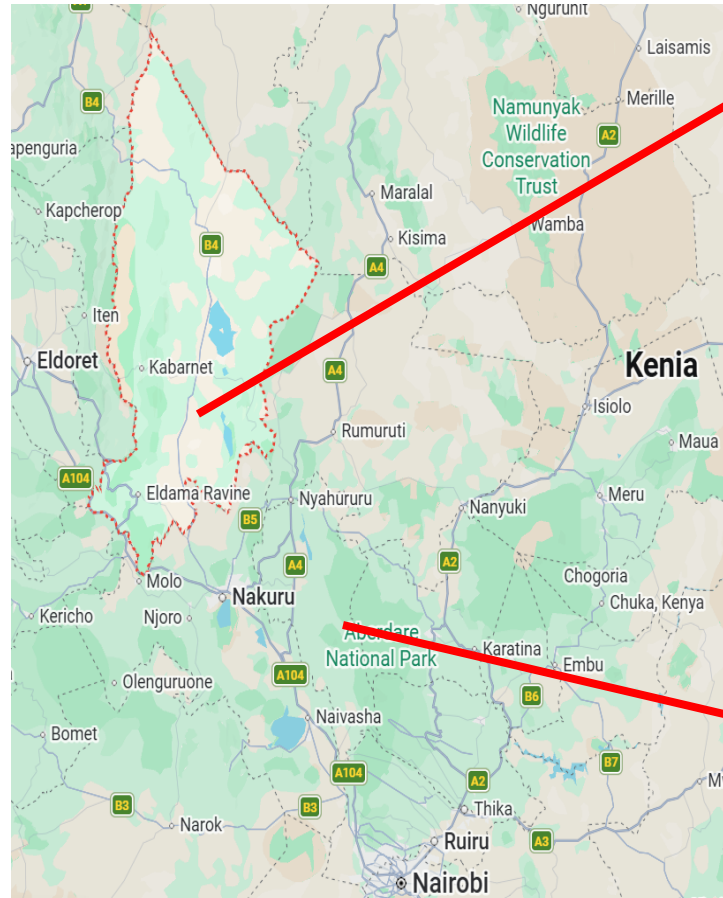
goats




Sampling
200 local animals



Sampling regions

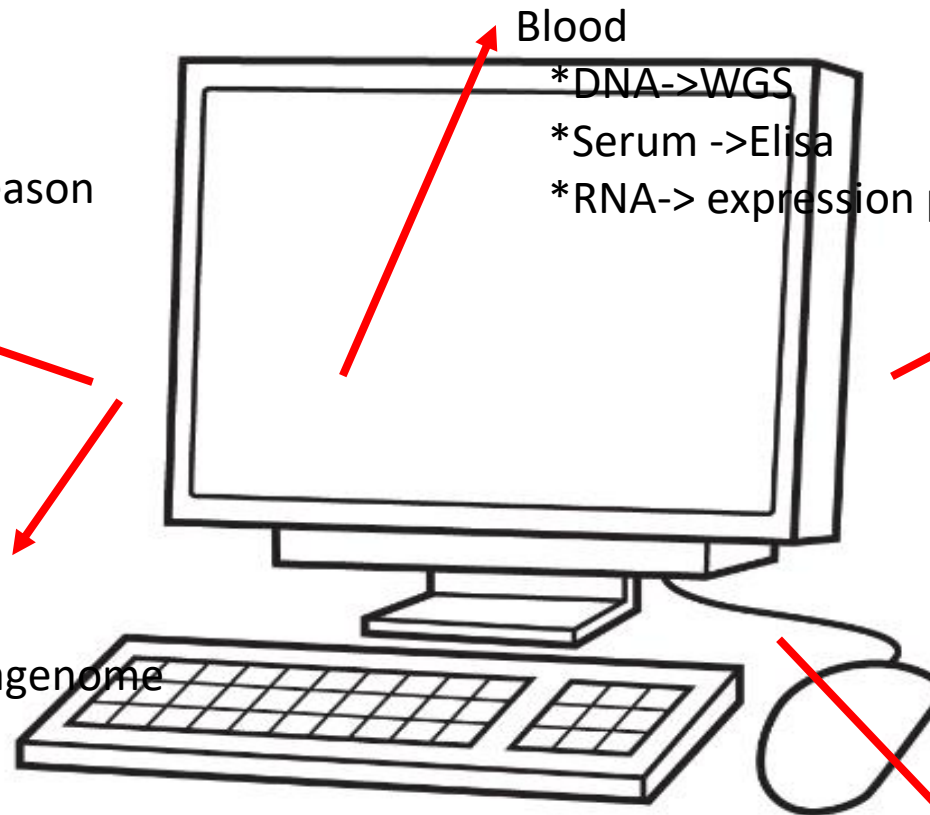


Sampling sheep/goats

Breath analysis 2x: wet and dry season
*Mask methane measurements
*LMD methane



Rumen
*DNA
*Metagenome



Blood

*DNA->WGS
*Serum ->Elisa
*RNA-> expression profiling

Fecal

*DNA
*Gut microbiome

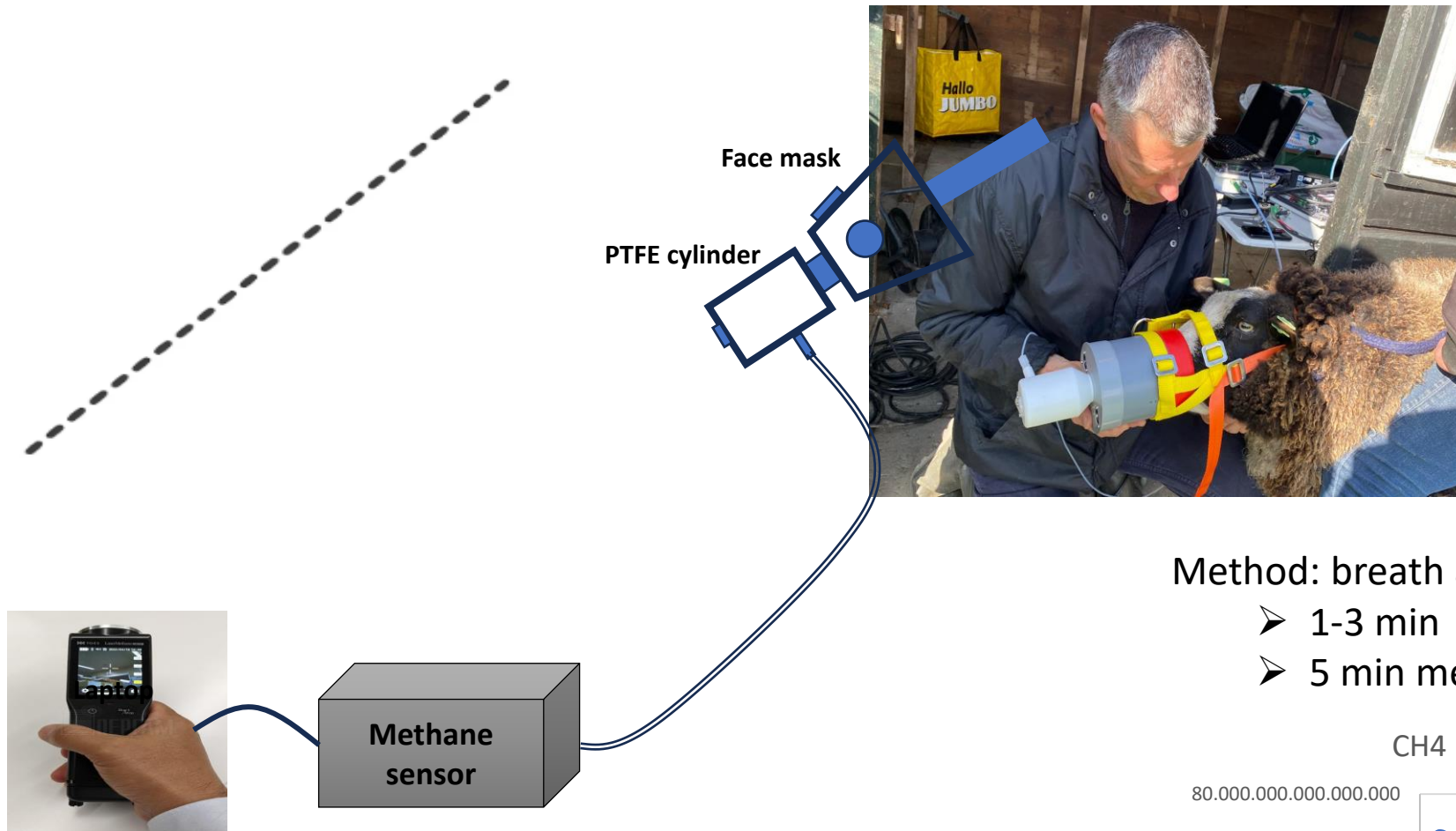
Hair

*fiber analysis
*Cortisol measurements

Milk

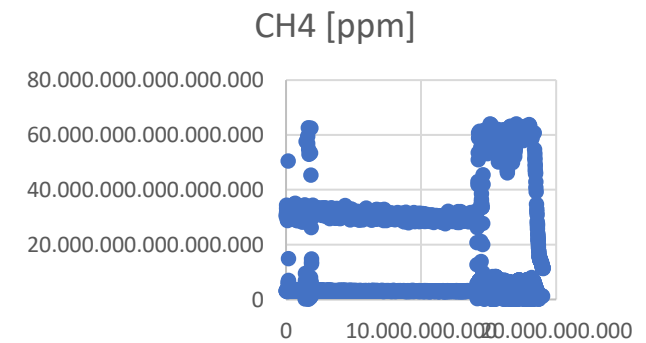
*MIR milk analysis
*protein, fat, oligosaccharides

Measuring methane 1: Mask system

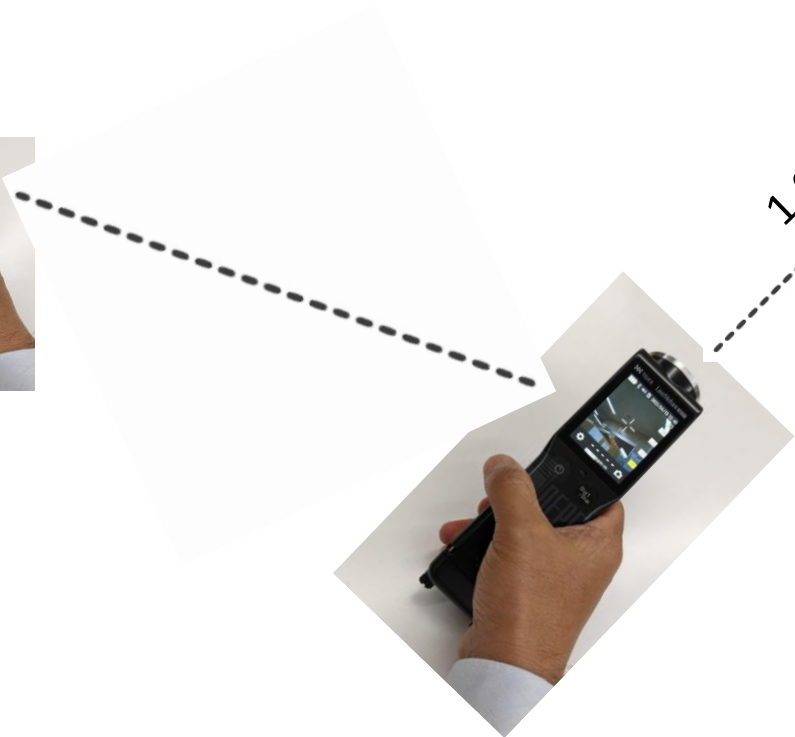


Method: breath analysis

- 1-3 min adjustment mask
- 5 min measuring



Measuring methane 2: Hand-Held-Laser system



Method: breath analysis

- Picture ear tag
- 5 min measurement

