Accelerate genetic progress to reduce methane emission – **Africa working group**

Chairs: Yvette de Haas & Raphael Mrode, May 23, 2025

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Global Methane Hub

Aim working groups

- Introduce Global Methane Genetics & running projects
- Bring people together and build network
- Share knowledge, experience, hurdles & issues
- Collaborate on key topics
    - E.g. Smaller groups, task force
- 2 meetings a year

Agenda

- Welcome & Aim
- Global Methane Genetics initiative (Birgit)
- ICAR Feed&Gas guidelines & wiki (Birgit)
- GMG Africa project (Raphael)
- Any other project to mention in Africa?
- Discussion:
    - Gaps & Needs, ideas, opportunities
- AOB

Global Methane Genetics (GMG)

Accelerating Genetic Progress to reduce methane in ruminants

Coordinators: Roel Veerkamp & Birgit Gredler-Grandl (WUR)

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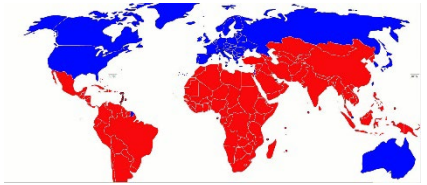
GMG: Why? How? What?



- Genetic progress can make a **permanent** and **impressive contribution** to reducing methane output from livestock systems **globally**
- We aim to accelerate genetic progress and to implement breeding strategies for reduced methane emissions in ruminants in the **global North and South** by supporting
  - **sharing of protocols** and **data**,
  - **expanding phenotyping**, breeding program design
  - **genetic evaluations**
  - development of **Global Livestock Genetics and Genomics Programs**

Global Methane Genetics initiative (GMG)

Accelerate genetic progress for low CH_4 emitting ruminants

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)

World-wide sharing
Develop protocols
Phenotyping for reference populations
Genetic evaluation
Impact of genetics

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

Africa
Dairy & crossbreeds (~1.5k)

South America
Beef & indigenous (~7k)

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

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Global Methane Hub

Global Methane Genetics (GMG) initiative

Key areas – current activities

- Projects get started
- Share data – data base for external and GMG internal data sharing
- Fair share principle
- SOP for recording & harmonisation of data pipelines across partners
- Build facility to test methane recordings of many individual cows

THE GLOBAL STANDARD
FOR LIVESTOCK DATA

Network. Guidelines. Certification.

ICAR Feed&Gas working group
ICAR Sheep, Goats & Camelids
ICAR Wiki-page

Birgit Gredler-Grandl & Chantal van Gemert

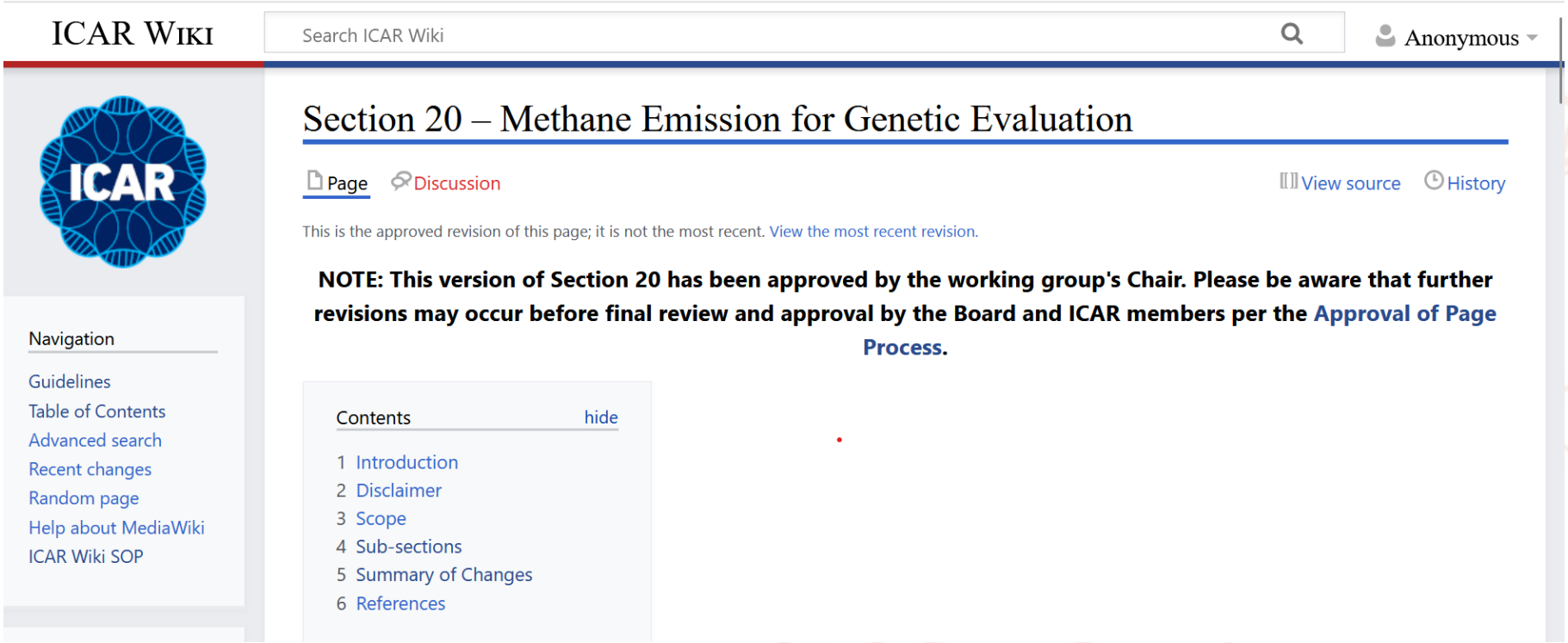
Wageningen University & Research

- Group Objectives
  - Update, promote and extend guidelines for phenotype recording – methane and feed intake in ruminants
  - Guidelines for full range of traits in sheep and goats
  - Harmonisation & standardisation
  - Conduct surveys, reports for recording schemes
  - Provide a forum and foster knowledge exchange
  - Facilitate and coordinate international collaboration

https://https://www.icar.org/group/working-group-sheep-goats-and-camelids/

https://www.icar.org/group/working-group-feed-and-gas/

- ICAR Wiki: https://wiki.icar.org/index.php/Guidelines
- Section 20: Methane emissions for genetic evaluations



- ICAR Wiki: https://wiki.icar.org/index.php/Guidelines
- Section 20: Methane emissions for genetic evaluations

4 Sub-sections

Definition and Terminology

Methane determining factors

Methane measurements methods

Sniffer SOP
GreenFeed SOP
PAC
LMD

Proxies

Proxies discussion

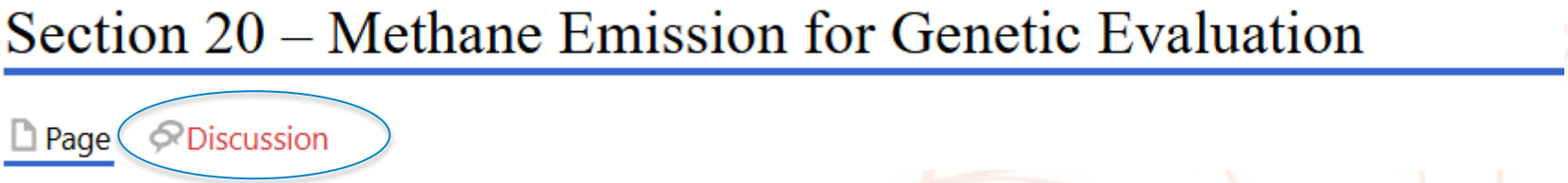
Merging and sharing data in genetic evaluations

Ongoing activities

Projects
Initiatives
Course material
…

- GMG projects/partners valuable source of existing & newly developed information
    - Recording devices
    - Protocols & SOPs – harmonisation of recording & data pipelines across countries
    - Do’s and dont’s
    - Differences between species/breeds
    - Anything that might be useful for others working with methane emissions
- Expect GMG partners & others contribute material/information

- **Feedback is welcome! Start a discussion!**
  - If you have information you would like to add to a specific page
  - If you notice information that is wrong, no longer up to date or incomplete
- Click on the discussion button at the top of the page



  - Fill in a subject and description and add the topic
  - The writers of the pages and everyone else can comment on these topics
- Would like to add information, feel free to open a discussion on the main page

Better lives through livestock

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

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

West Africa Team:Habibou ASSOUMA (CIRAD) and Luc Hippolyte Dossa (UAC)

South Africa Team: Giel Scholtz (ARC)

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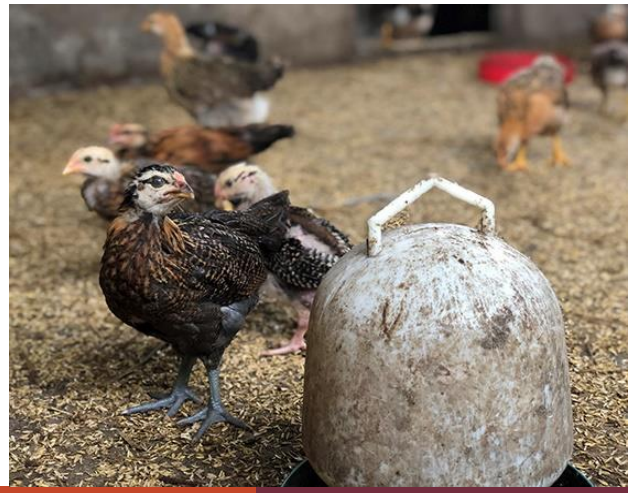
Dimensions of the project

- Project implemented in three regions of Africa
- West Africa:
  - Mohamed Habibou ASSOUMA (CIRAD) and Luc Hippolyte Dossa (UAC)
  - CIRAD, CIDES, Université d'Abomey-calavi (UAC)
  - Burkaso Faso and Benin
- South Africa:
  - Giel Scholtz
  - Agricultural Research Council, South Africa (ARC),
- East Africa: Kenya and Ethiopia
  - ILRI - Raphael Mrode



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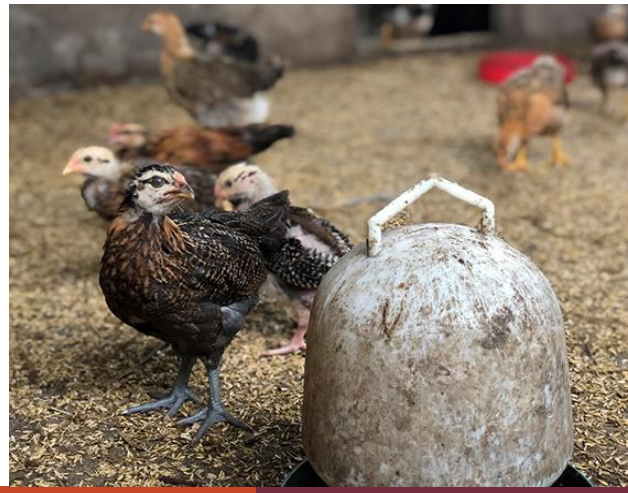
Four Work packages

1: Phenotyping for CH_4, production traits and genotyping of animals

2: Microbiome profiling, fecal sampling and sequencing of microbiome.

3: Design genetic models for joint data analysis dairy cattle data from different regions of Africa; analysis of microbiome sequence data and mapping to CH4 and productive traits.

4: Working with government national breeding centers and private breeding organizations to feed outcomes into existing breeding programs for improved productivity and efficiency



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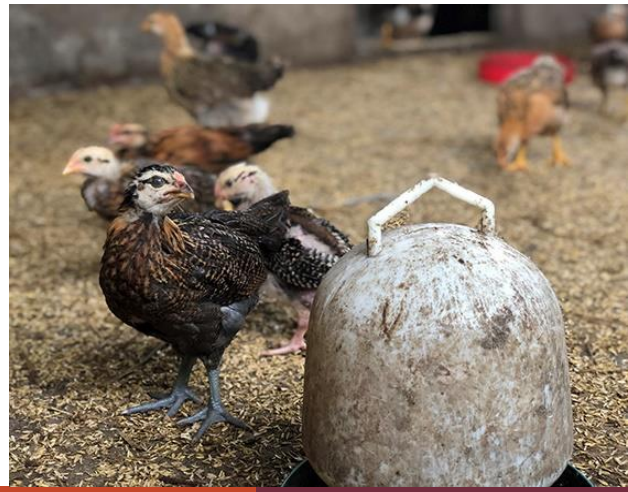
WP1: Phenotyping

- West Africa
  - Two experimental stations
  - UAC (Benin) : 20 cows measured from 4 breeds - Girolando (exotic), White Fulani, Goudali, Borgou (LMD and Greenfeed)
  - CIRDES (Burkina Faso) : 20 cows - Sudanese Zebu Peul and Azawak (LMD and GreenFeed)
  - Benin - 75 cows in government farm - LMD
- South Africa
  - 20 bull calves each, from the Afrikaner, Bonsmara and Nguni beef breeds over 3 years (LMD and GreenFeed)



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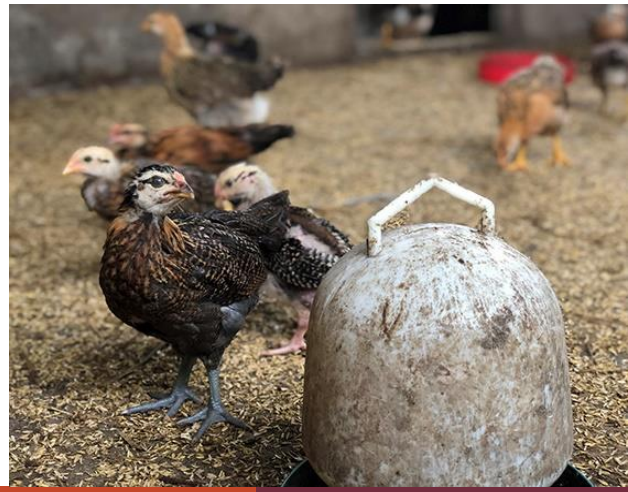
WP1: Phenotyping

- East Africa
  - Kenya and Ethiopia
  - 1800 cows measured in smallholder farms in each country over 3 years (LMD)
  - 180 cows in medium /large farms in each country (LMD and Greenfeed)



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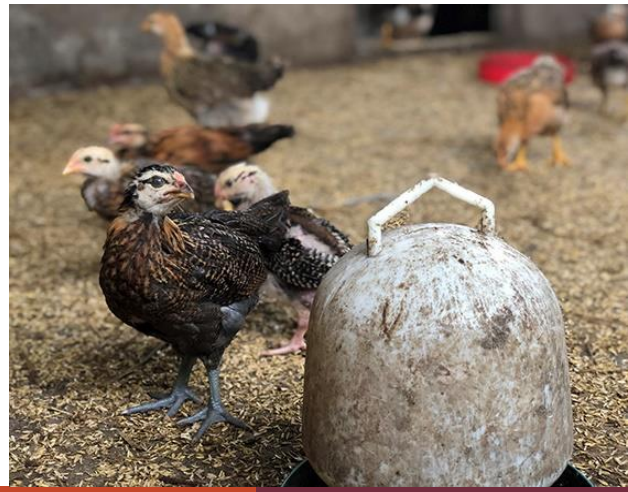
WP2: Microbiome profiling, fecal sampling and sequencing of microbiome

- Microbiome sampling will be collected on 1000 tropical cows using the oral stomach tubing method
- West Africa : 40
- South Africa : 180
- East Africa : 680

- Fecal samples also available for the East Africa samples



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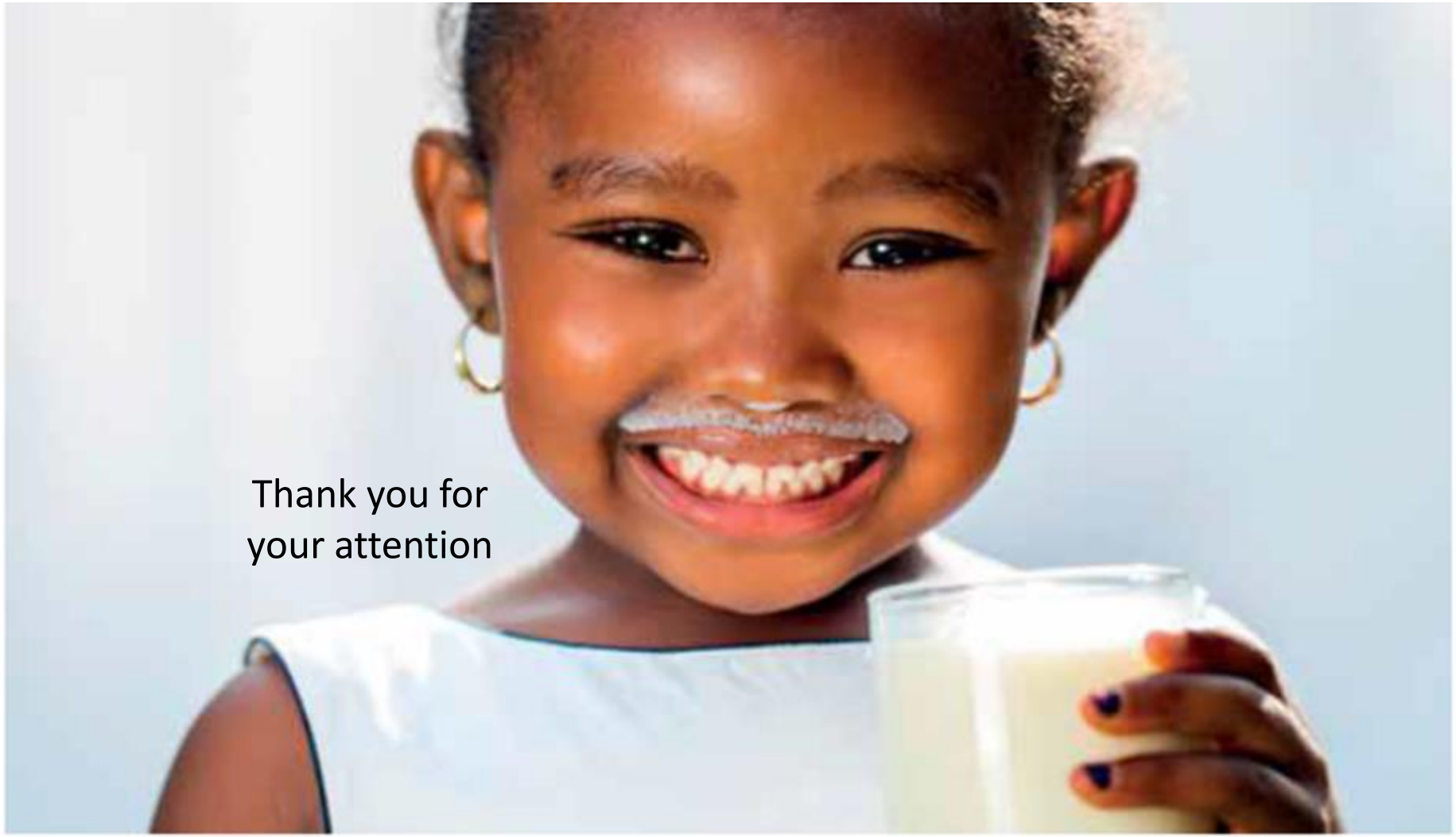
Update on Status

- Order placed with C-Lock for 2 Greenfeed units with Grid systems
- Order placed for 6 units of LMD units
- CRA with ARC, South Africa is being processed
- CRA with West Africa initiated
- Two farms for first location of Greenfeed units identified
- Work plans are being drafted- Ethiopia and Kenya
- Ethical approval (IREC and IACUC) at ILRI commencing
- Registered for overall launch of project in Innsbruck

Some concerns

- Microbiome sampling will smallholder farms could be a challenge
  - May need some incentive
  - Permission from Veterinary Department
- Limited experience with utilizing GreenFeed



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