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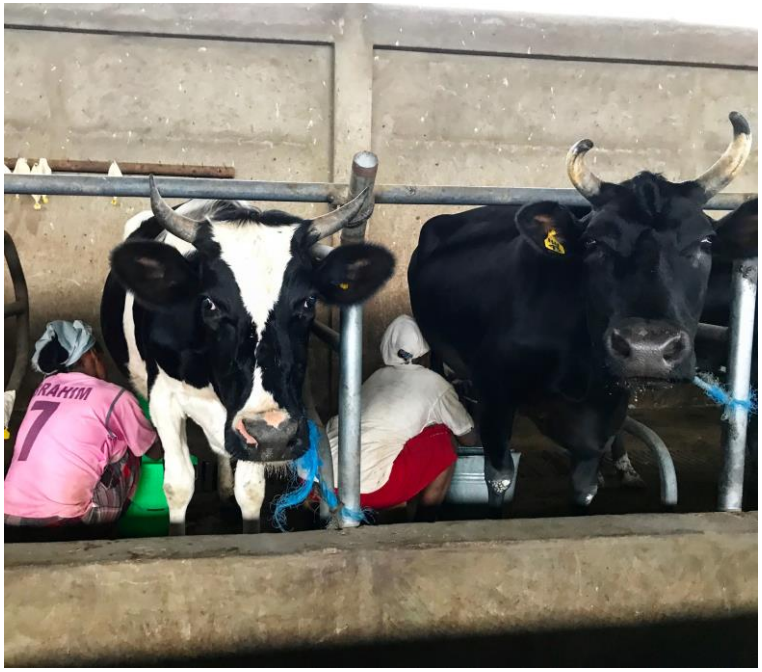
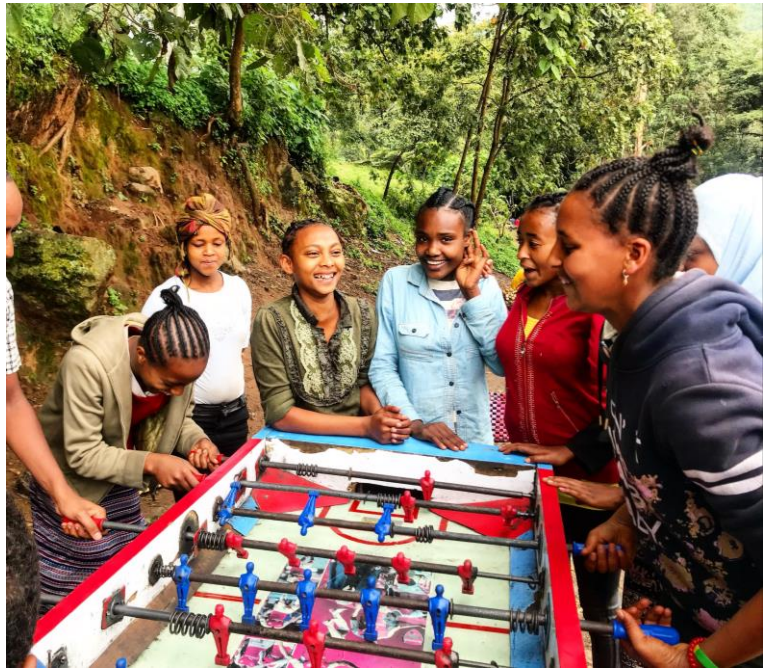
Linking Cattle Nutrition to Human Nutrition: Year 3 Update





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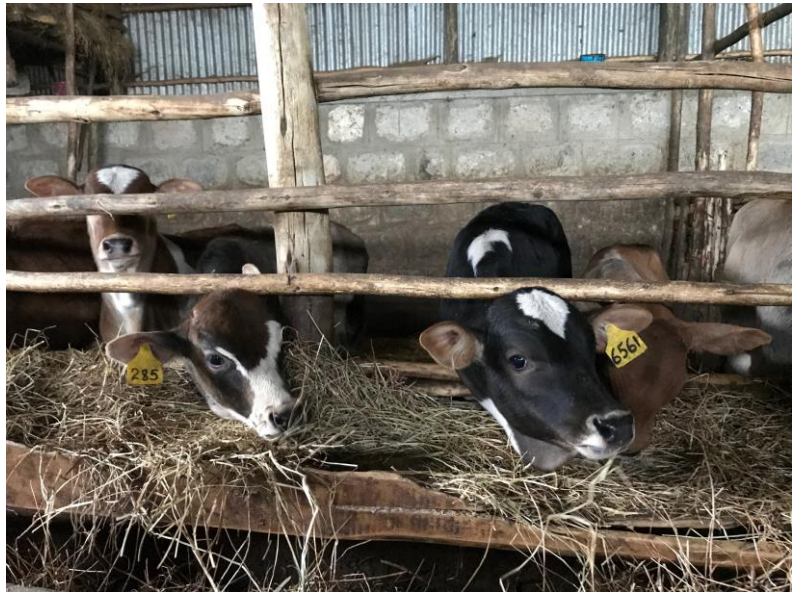
OVERALL PROJECT OBJECTIVE

- To create a systems-based research approach that strengthens linkages between improved animal source food production and consumption practices and human nutrition outcomes in Ethiopia.



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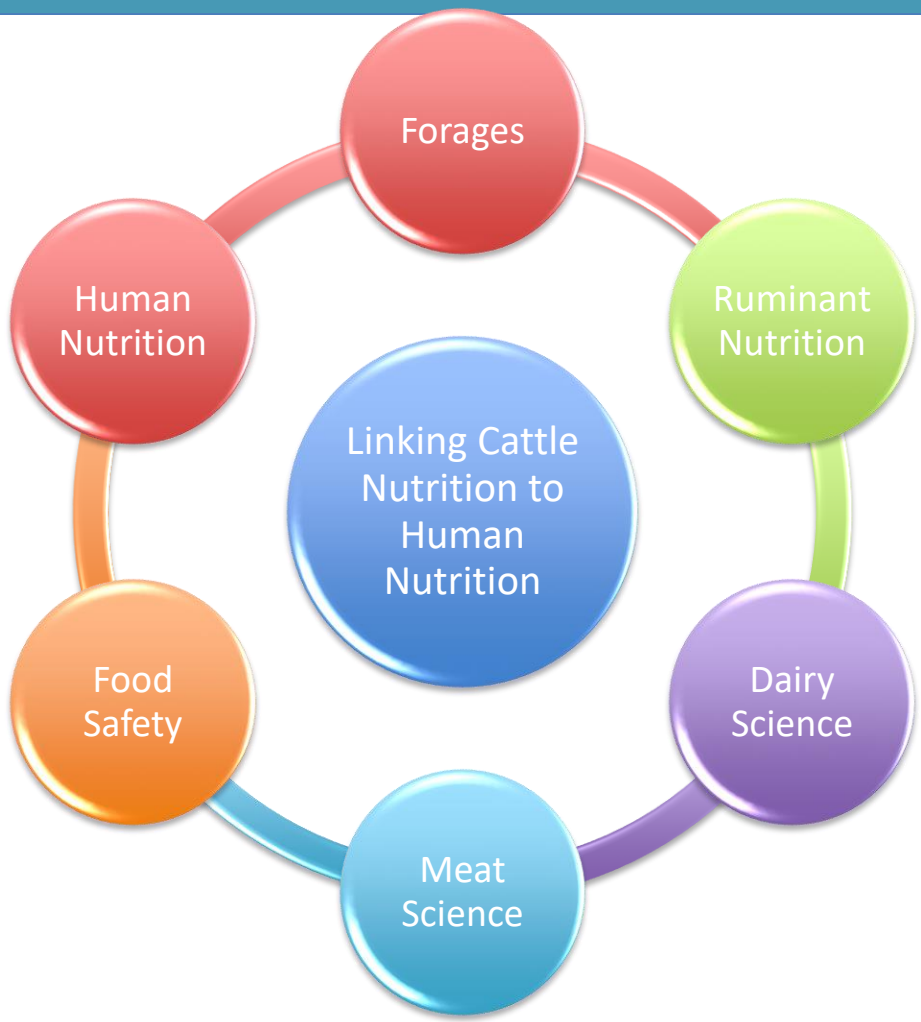
Research Domains



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FORAGE DOMAIN PROGRESS

Objectives:

1. Identify/develop suitable alternative forage and dual purpose genotypes/ varieties of sorghum (2017-2018).

2. Identify/develop packages of production management that maximizes yield and quality of feeds from sorghum based cropping system (2017-2018).

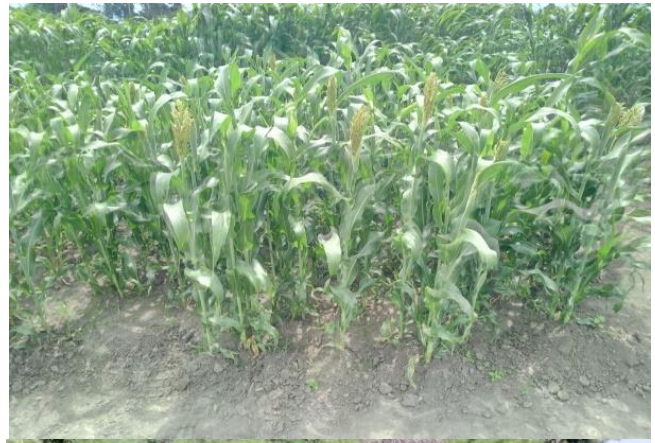
3. On farm demonstration and evaluation of efficiencies of various sorghum based forage/fodder business models (2019-2020).

Forage Domain Outcomes

- Nutritional quality characterization of Ethiopian sorghum collections showed variation among landraces for selection and improvement of forage traits.
- Phenotypic characterization of Ethiopian sorghum collections showed considerable variation among landraces for selection and improvement of forage traits.
- Ten genotypes have been selected and promoted to National Variety Trial (NVT) on basis of Invitor Organic Material Digestibility (IOMD).
- The findings from all completed activities will be packaged into certain models with farmer consultations.

FORAGE DOMAIN NEXT STEPS

- Seed multiplication for on-farm demonstration of forage technologies.
- On farm evaluation & demonstration of efficiency of various alternative sorghum based forage models.
- Farmer's management practices, economic trade-offs and nutritive values of sorghum biomass use for livestock feed in major sorghum growing areas of Ethiopia.
- The findings from all completed activities will be packaged in to certain models with farmer consultations.



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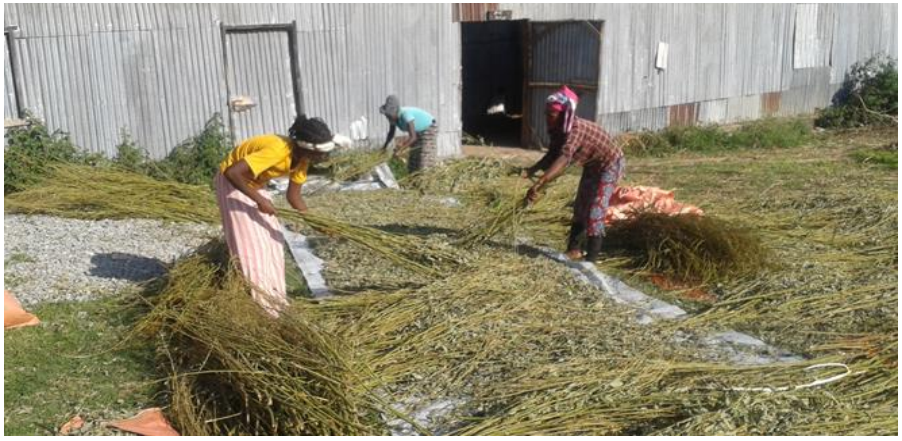
RUMINANT NUTRITION DOMAIN PROGRESS

Objectives:

1. Assess strategies for improved protein nutrition of lactating cows differing in genetic capacity for milk production (2019).

2. Evaluate impacts of improved dry season feeding strategies (2019-2020).



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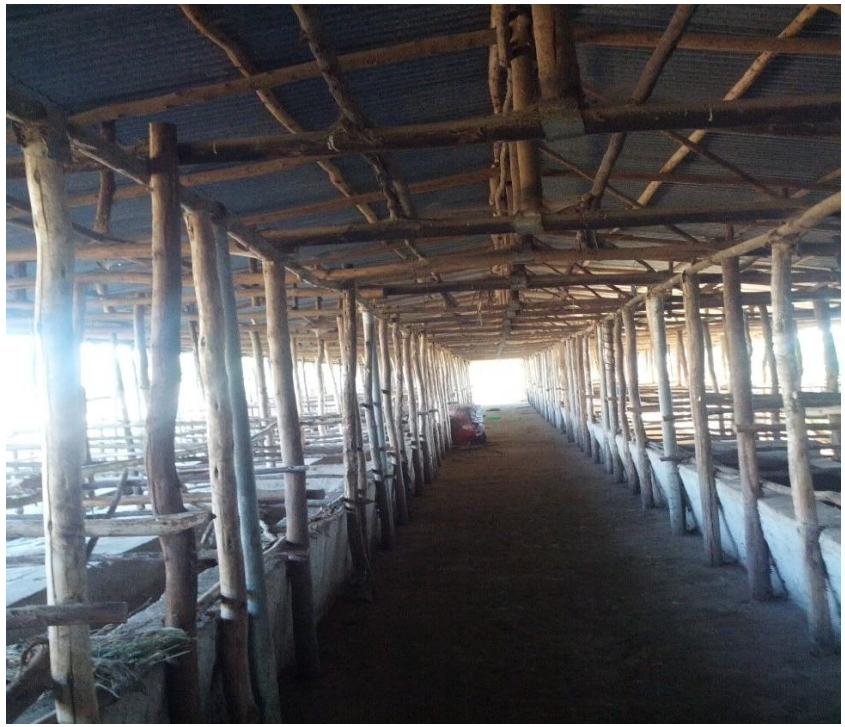
RUMINANT NUTRITION OUTCOMES

- Sorghum silage
  - Sorghum was produced on 2.5 ha
  - Two silos were constructed (5 x 2.5m each)
  - Silage has been prepared and is ready for utilization
  - Sorghum stover collected and kept under shed
- Pigeon pea
  - Produced on 2 ha
  - Harvested, cured, leaf separated from the branch and kept in sacks in a feed store

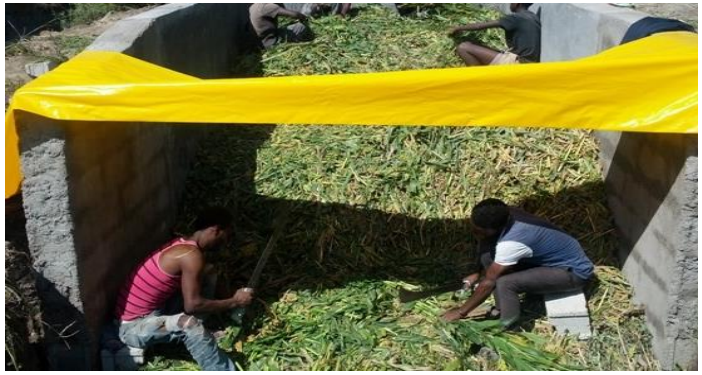
PREPARATION FOR FEEDING TRIALS

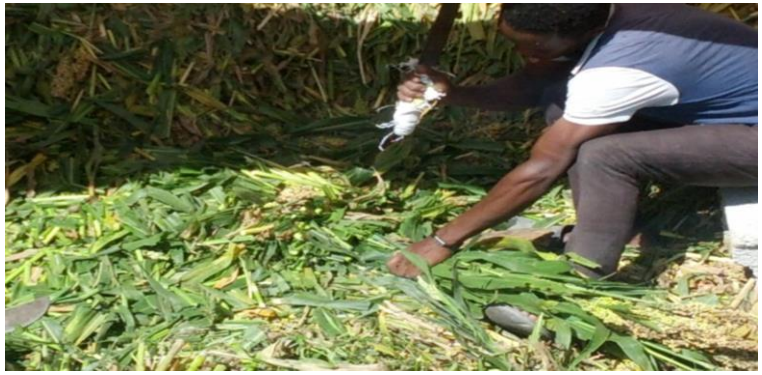
- Old barn was cleaned and maintained and feeding troughs were modified to fit for individual feeding of experimental animals.
- Screening animals to be used in the experiment (11 dairy cows have been selected and about 4 more are expected to deliver soon).



RUMINANT NUTRITION NEXT STEP

- In the process for purchasing additional animals and concentrate feeds for feeding trials.
- Two feeding experiments have been planned to be conducted in the next 6 months (one with cows and the other one with calves).
- Begin laboratory analysis.





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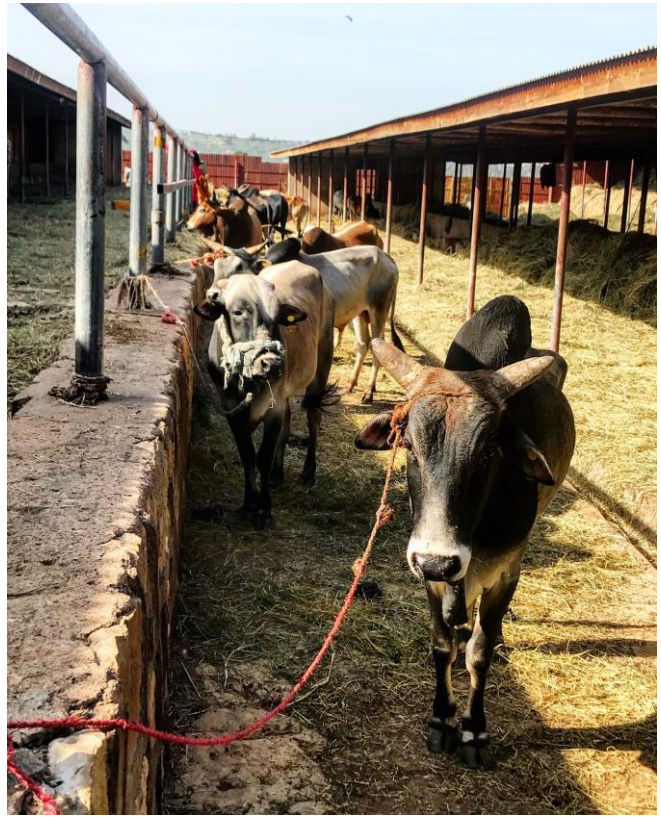
MEAT SCIENCE DOMAIN PROGRESS

Objectives:

1. Assess the eating quality attributes of beef currently produced at local abattoirs (2017-2018).

2. Assess the effects of production system and transportation on stress on multiple cattle breeds (2018).

3. Suggest possible intervention options for improvement (2019-2020).



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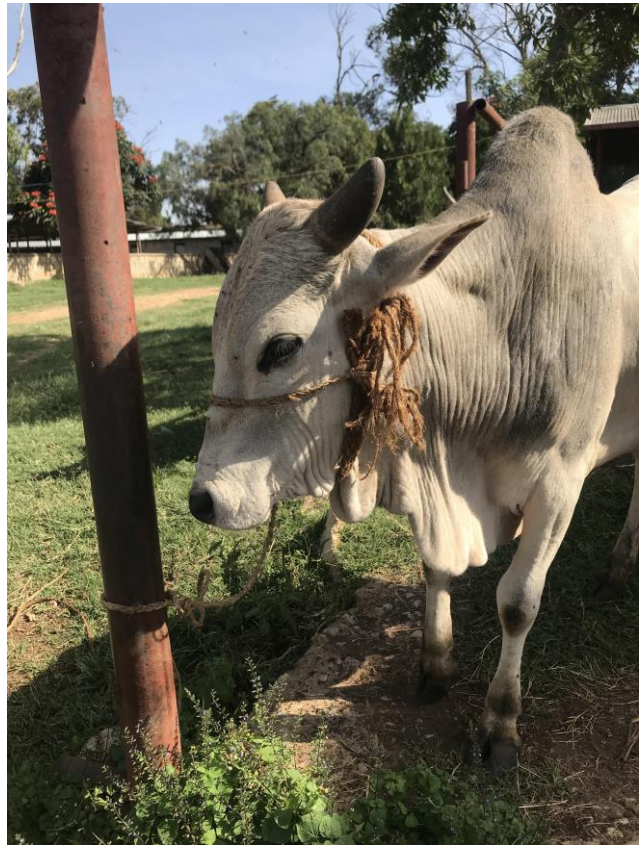
MEAT DOMAIN OUTCOMES

- Instrumental evaluation of tenderness evaluation showed differences in meat tenderness (WBSF values) based on:
  - Breed (Harar, Arsi, Bale)
  - Age (3-7, 7-9, >9 years)
- Sensory evaluation of tenderness showed no differences in meat tenderness based on:
  - Breed (Harar, Arsi, Bale)
  - Season
- Instrumental evaluation of tenderness showed differences in meat tenderness from different production systems:
  - Boran
  - Arsi
  - Harar

MEAT DOMAIN OUTCOMES

- Stress level measurements, based on creatine kinase (CK) and lactate dehyrogenase (LDH), were high in Arsi cattle when compared to Boran.
  - Boran cattle were purchased form Didi Tiyara ranch
  - Aris cattle were purchased from local market

- Question: Is the level of stress observed on the two breeds due to environment (market, feeding, etc.) or genetics?



MEAT DOMAIN NEXT STEPS

1. Evaluate tenderness of beef (Cross breeds, Arsi, Boran and Harar Sanga) finished on similar condition.

2. Investigate the physiological and genetic bases of tenderness of beef from Cross breeds, Arsi, Boran and Harar Sanga.

3. Determine genetic difference for susceptibility/ resistance to stress (Cross breeds, Arsi, Boran and Harar Sanga).

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FOOD SAFETY DOMAIN PROGRESS

Objectives:

1. Review paper on the prevalence and AMR profile of bacterial pathogens isolated form meat and meat products in Ethiopia (2018).
2. Baseline assessment on food safety knowledge and practices of abattoir workers in three regions of Ethiopia (2019).
3. Microbial baseline study on *Salmonella* spp. in municipal abattoirs in there regions of Ethiopia, and *Salmonella* spp. transmission case study (2019-2020).
4. Education and training interventions for abattoir workers (2020).

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FOOD SAFETY DOMAIN OUTCOMES

Zelalem *et al. International Journal of Food Contamination* (2019) 6:1
https://doi.org/10.1186/s40550-019-0071-z

International Journal of Food Contamination

REVIEW Open Access

The prevalence and antimicrobial resistance profiles of bacterial isolates from meat and meat products in Ethiopia: a systematic review and meta-analysis

Andarge Zelalem[1*], Mekonnen Sisay[2], Jessie L. Vipham[3], Kebede Abegaz[4], Ameha Kebede[1] and Yitagele Terefe[5]

Abstract

Background: Foodborne diseases associated with the consumption of meat and its products are of public health significance worldwide. The study is, therefore, aimed to estimate the prevalence and the antimicrobial resistance profile of some bacterial pathogens isolated from meats and its products in Ethiopia.

Methods: Literature search was conducted from major electronic databases and indexing services including PubMed/MEDLINE, Google Scholar, Science Direct and WorldCat. Both published and unpublished studies addressing the

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FOOD SAFETY DOMAIN NEXT STEPS

- *Salmonella* spp. municipal abattoir baseline sample and data collection.
  - Addis municipal abattoir
  - Harar municipal abattoir
  - Hawassa municipal abattoir
- *Salmonella* spp. transmission case study.
  - Harar
  - Hawassa
- Education and training intervention design, implementation, and assessment.

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HUMAN NUTRITION DOMAIN PROGRESS

Objectives:

1. Determine the current **dietary behaviors** related to the consumption of **animal products** at the household level (2018).

2. Identify the **cultural, environment, and economic barriers**, if any, to the adequate consumption of animal products (2018).

3. Determine the **nutritional status of children and women (**2018**)**.

4. Determine appropriate **human nutrition interventions** to overcome barriers (2019).

5. Evaluate the effect/impact of **gender based nutrition sensitive interventions** on the **consumption of animal source foods and nutritional status** by household, women and children (2019).

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HUMAN NUTRITION DOMAIN OUTCOMES

- Collected household level baseline data for nutrition:
  - *n*=650 mother child pairs
  - Two regions (Oromia and SNNPR)
  - One District/Woreda in Oromia and two Districts/Woredas in SNNPR
  - Total of twelve Kebeles

- Collected household level nutrition status data for women and children:
  - *n*=650 mother child pairs
  - Two regions (Oromia and SNNPR)
  - One District/Woreda in Oromia and two Districts/Woredas in SNNPR
  - Total of twelve Kebeles

HUMAN NUTRITION DOMAIN NEXT STEPS

- Finalize data analysis for household baseline data.
- Based upon findings from the baseline data, determine the appropriate human nutrition interventions to overcome barriers.
- Evaluate the effect/impact of gender based nutrition sensitive interventions on the consumption of animal source foods by household, women and children.
- Evaluate the effect/impact of gender based nutrition sensitive interventions on nutritional status (anthropometric and biochemical [if possible] of women and children).

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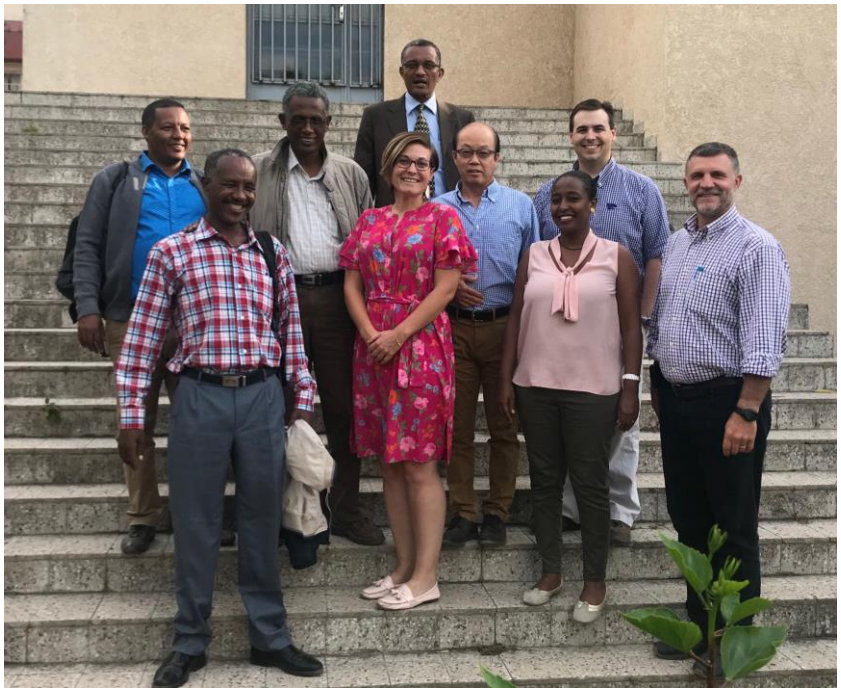

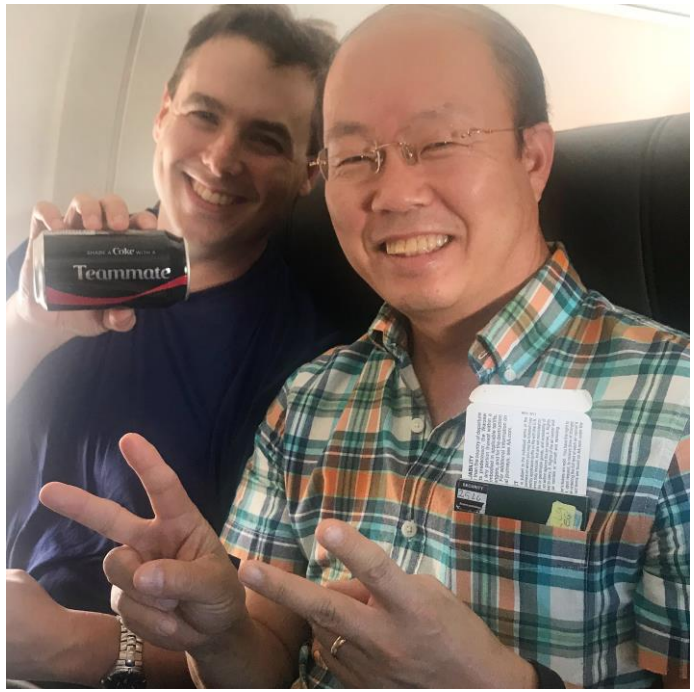

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