



WEBINAR SERIES

Livestock & Livelihoods

WEDNESDAY, JULY 7
9 A.M. EST | 4 P.M. EAT

Leveraging Livestock to Combat Malnutrition: Perspectives From East Africa

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Tech Tips

- **Do not use your built-in computer** microphone; use a USB-headset with integrated microphone, or wired cell-phone earphones/mic, **not Bluetooth**. An external USB-wired microphone is the next best solution.
- **Put your full name and organization - Tsehay Gashaw (ILRI)**
- **Close captioning** has been enabled
- **Microphone off** when not speaking, please.
- **If you can't hear or see:** close and restart zoom, close other programs.
- **Use the chat** to post comments or questions during the presentations. Create a conversation!
- **Video is optional**, be aware that others may have less bandwidth than you.
- **The session is recorded** - audio, video and chat - and any private chats are also visible to the organizers.

Leveraging Livestock to Combat Malnutrition: Perspectives from East Africa



John Ellenberger
Executive Director
Venture37

Video: A Spotlight on East Africa: Nutrition and Livestock in Rwanda



Leveraging Livestock to Combat Malnutrition: Perspectives from East Africa



Lora Iannotti

Associate Professor, Public Health
Washington University in St. Louis

Building the Narrative: Livestock in Sustainable Healthy Diets

Lora Iannotti, PhD

Associate Professor

Director, E3 Nutrition Lab

Washington University in St. Louis

Food Security Webinar: 7 July 2021

*Livestock: An essential part of addressing the lifelong debilitating effects of
stunting and malnutrition*

Key Messages

- Stunting affects 144 million young children globally (21.3%), with serious consequences for growth and brain development (SOFI 2020)
- LDFs can play a critical role in alleviating stunting and malnutrition, but there are large consumption disparities
- LDFs provide limiting nutrients in highly bioavailable matrices, thus are powerful in abundance and in scarcity
- Epidemiological evidence supports the need to ensure access to LDFs during certain periods of the life course - childhood, pregnancy and lactation, and old age
- Action is needed to rebalance food systems and support sustainable, mixed livestock production to safeguard human, animal, and planetary health



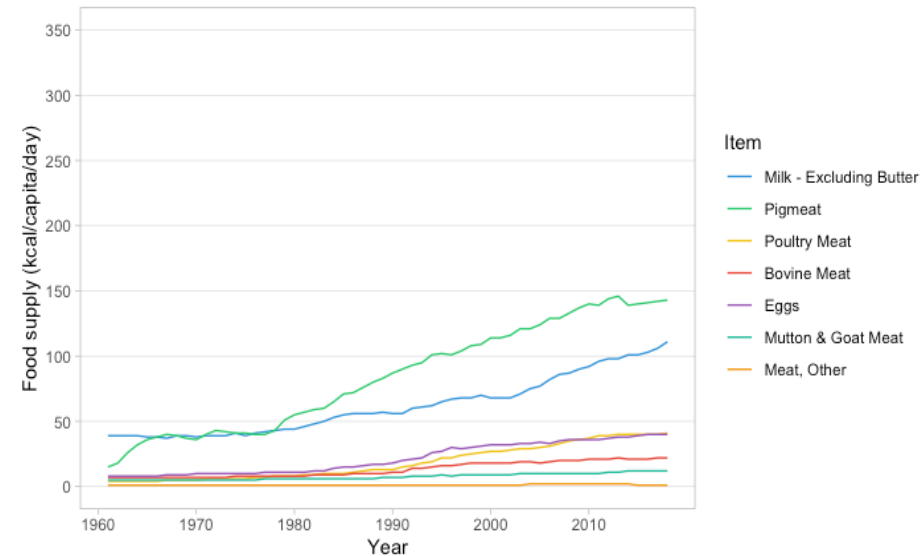
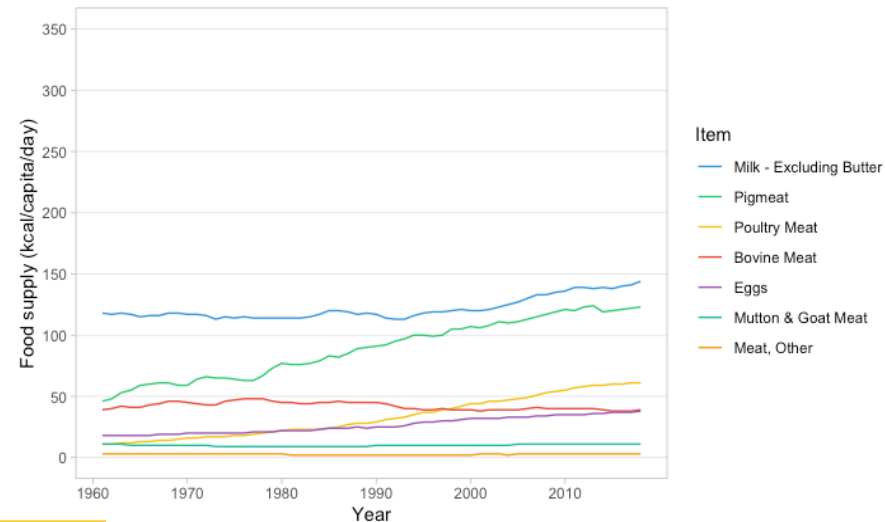
Nutritional importance of LDFs

Bioavailability & Epidemiology

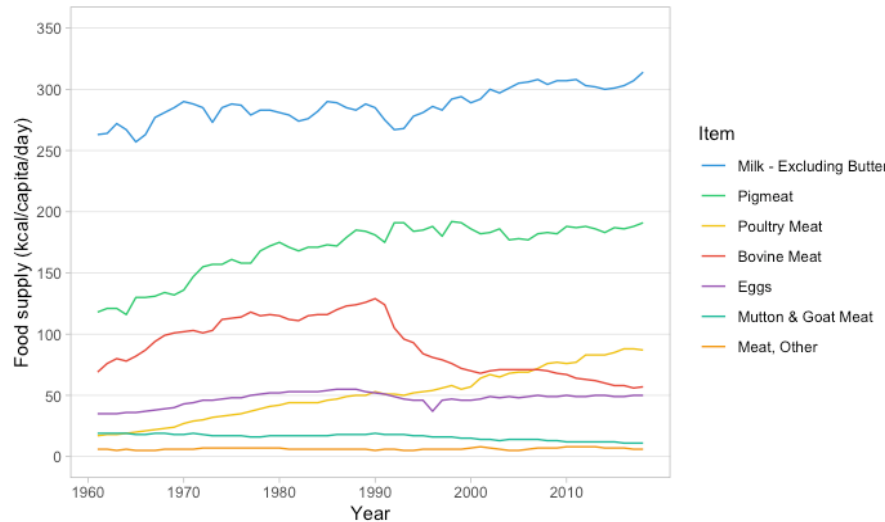
LDF consumption disparities

Asia

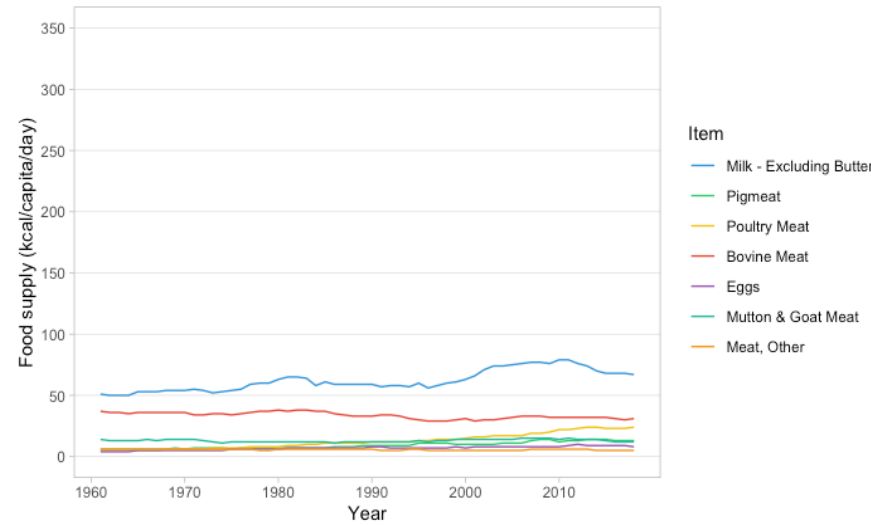
World



Europe



Africa

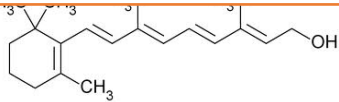
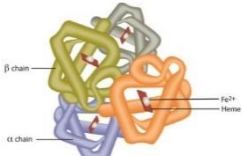

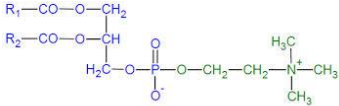


LDFs are nutrient-dense and bioavailable

- **Protein:** Digestible indispensable amino acid score of eggs and milk >100%, compared to 37% rice, or 45% wheat
- **Fatty acids:** DHA and other PUFA found in LDFs, but also saturated/trans fats
- **Vitamins:** A, B3 (niacin), B6 (pyridoxine), B12, D, choline
- **Minerals:** Ca, Zn, Fe, Se concentrated in LDFs
- **Bioactive factors:** taurine, creatine, carnosine



Nutrient matrix: bioavailability of LDFs

Nutrient rate	LDF Matrix	ASF vs PSF absorption
Vit A →		12-24x (ug)
Iron →		2x (mg)
Zinc →		2x (mg)
Choline →	 Phosphatidylcholine	-

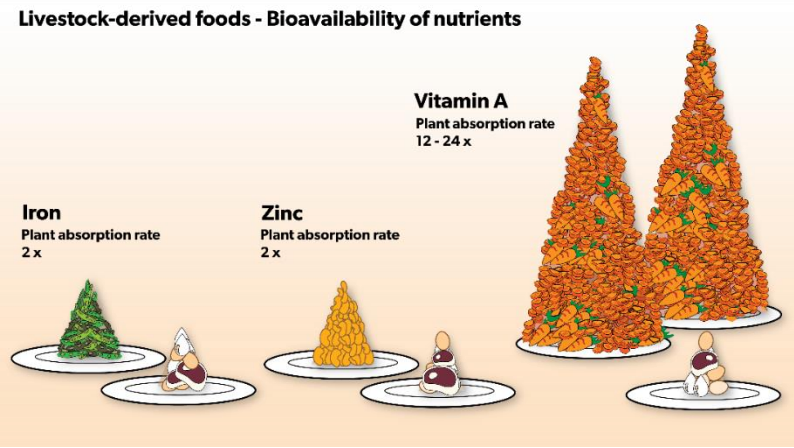


Image: ILRI (A. Slater)

Epidemiological evidence → differences by life course phase

- Infants and young children
 - Cochrane review five studies **ASF in 6-24 mo increased HAZ** (Eaton et al. 2019)
 - Systematic review ASF showed **reduced stunting in one RCT** and one cross-sectional study (Shapiro et al. 2019)
- School-age children
 - **Cognitive function improved** in meat group compared to milk & control groups; **improved growth** in both the milk and the meat groups (Neumann et al. 2007)
 - Children < 18 yrs from Asia showed meat consumption **increased risk of overweight/obesity** (Yang et al. 2012)
- Pregnant and lactating women
 - Systematic review showed maternal supplementation with animal protein **increased birth weight** (Pimpin et al. 2019)
- Adults
 - **Processed meats** linked to colorectal/other cancers, cardiovascular disease, and diabetes
 - Prospective studies in high-income countries showed ↑all-cause mortality rates associated with **high red and processed meat** compared to low quantities; **no association or inverse for poultry** (Godfray et al. 2018)
- Elderly
 - Systematic review showed cow milk protein supplements **preserved muscle mass and sped recovery after hospitalization** in the elderly (Zanini et al. 2020); Meta-analysis of milk protein combined with resistance training improved **fat-free mass** (Hidayat et al. 2016)
 - Meta-analysis of cohort studies showed **no association between milk intake and hip fracture** in women but more data needed in men (Bischoff-Ferrari et al. 2010)

E3 Nutrition Lab Research Findings



- Ecuador Lulun Project
 - RCT to test efficacy of eggs in early complementary feeding period
 - Linear growth increased by 0.63 LAZ, stunting reduced by 47% (Iannotti Pediatrics 2017)
 - Choline increased by 0.35 and DHA by 0.43 effect sizes (Iannotti et al. *AJCN* 2017)
- Samburu Milk Nutrition in Pastoralists
 - Livestock ownership increased nutrient adequacy for vitamin A, B₁₂, and zinc (Iannotti and Lesorogol CA 2014)
 - Milk consumption increased BMI z scores among youth (Iannotti and Lesorogol *AJPA* 2014)
 - Cattle and chicken ownership increased dietary diversity

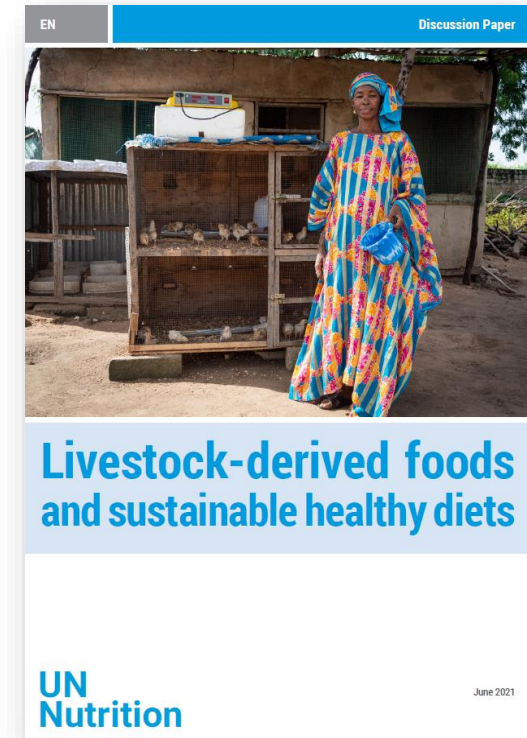


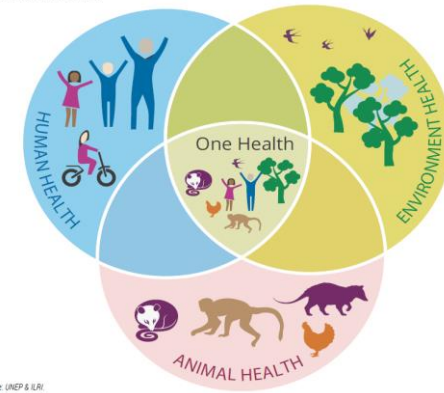
Taking Action

UN Nutrition paper & Global Nutrition Targets

UN Nutrition Paper

- Recently launched this consensus document to build the narrative around LDFs in sustainable healthy diets. Its conclusions align with key messages today:
- Implications of LDFs depend on: 1) *context*, 2) *life course phase*, and 3) *production system*
 - Nutrition inequities prevail globally, notable LDF apparent dietary intake patterns
 - LDFs provide critical nutrients in bioavailable matrices
 - Ensure LDF access for children, pregnant/lactating women, and elderly
 - LDF production has serious impacts on the environment but opportunities exist to mitigate climate change and environment impacts
- Rebalance food systems for equitable LDF consumption and support sustainable, mixed production systems to protect human, animal, and planetary health





Source: UNEP & ILRI

Taking action

- ENABLING ENVIRONMENT

- Equitable Food Systems – protect affordability ASF, diverse high quality diets for all
- Policies & Programs - ensure access in critical stages of life course, social and behavioural change, FBDG

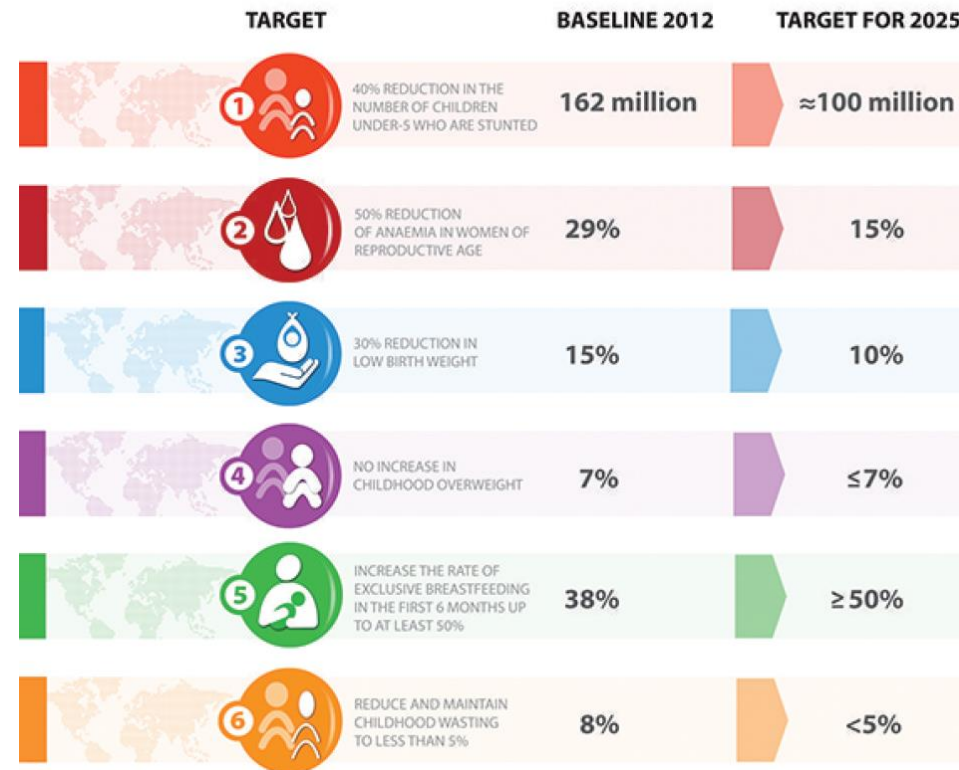
- PLANETARY HEALTH

- Mitigating environment impacts of LDF production – mixed farming systems, adaptation to local environments, and sustainable animal types
- One Health principles – small-scale producers, women farmers, efficiencies in feed-conversion rates, local breeds, etc.

- RESEARCH AND INSTITUTIONS

- Research – build evidence-base for LDFs, biodiversity/diet diversity, bidirectionality of climate change and LDFs
- Institutional commitments – UN Nutrition, ILRI, UN Decade on Nutrition

Global Nutrition Targets 2025 – ASF Contribution



In sum, LDFs can play an important role in meeting *Global Nutrition Targets* – stunting, anemia, and LBW – and achieving *SDGs* 2 (zero hunger), 12 (responsible consumption and production), and 13 (climate action)

E3 Nutrition Lab



Research to identify interventions that promote healthy growth and development in the most vulnerable populations globally, with the following criteria:

Equitably accessed

Evolutionarily appropriate

Environmentally sustainable



Research sites: Ecuador, Haiti, Kenya, Global

Role: scientific perspective and infuse evidence-base

Rapid Fire Presentations



Rwandan cheese producer checks for quality of the product
Photo credit: Land O'Lakes Venture37

Leveraging Livestock to Combat Malnutrition: Perspectives from East Africa

Presenters:



Joachim Balakana

National Coordinator
Venture37 Tanzania,
Technical Lead of Dairy Nourishes Africa
Tanzania Pilot Project



Emily Ouma

Agriculture Economist
International Livestock Research Institute



Getnet Assefa

Senior Technical Services Support Livestock Specialist
Venture37



Tadesse Zerfu

Public Health Specialist and Marie Skłodowska-Curie
Actions Post-Doctoral Research Fellow
Global Academy of Agriculture and Food Security,
University of Edinburgh, UK



Improving Access to Animal Sourced Foods

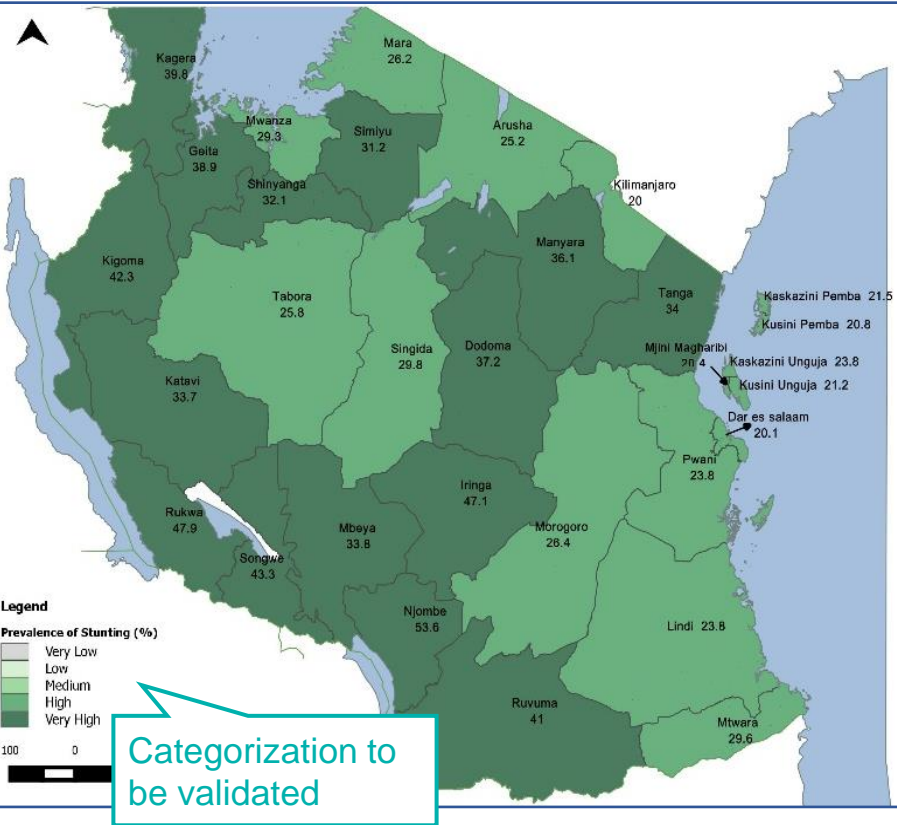
Joachim Balakana
National Coordinator
Venture37 Tanzania,
Technical Lead of Dairy Nourishes Africa Tanzania Pilot Project



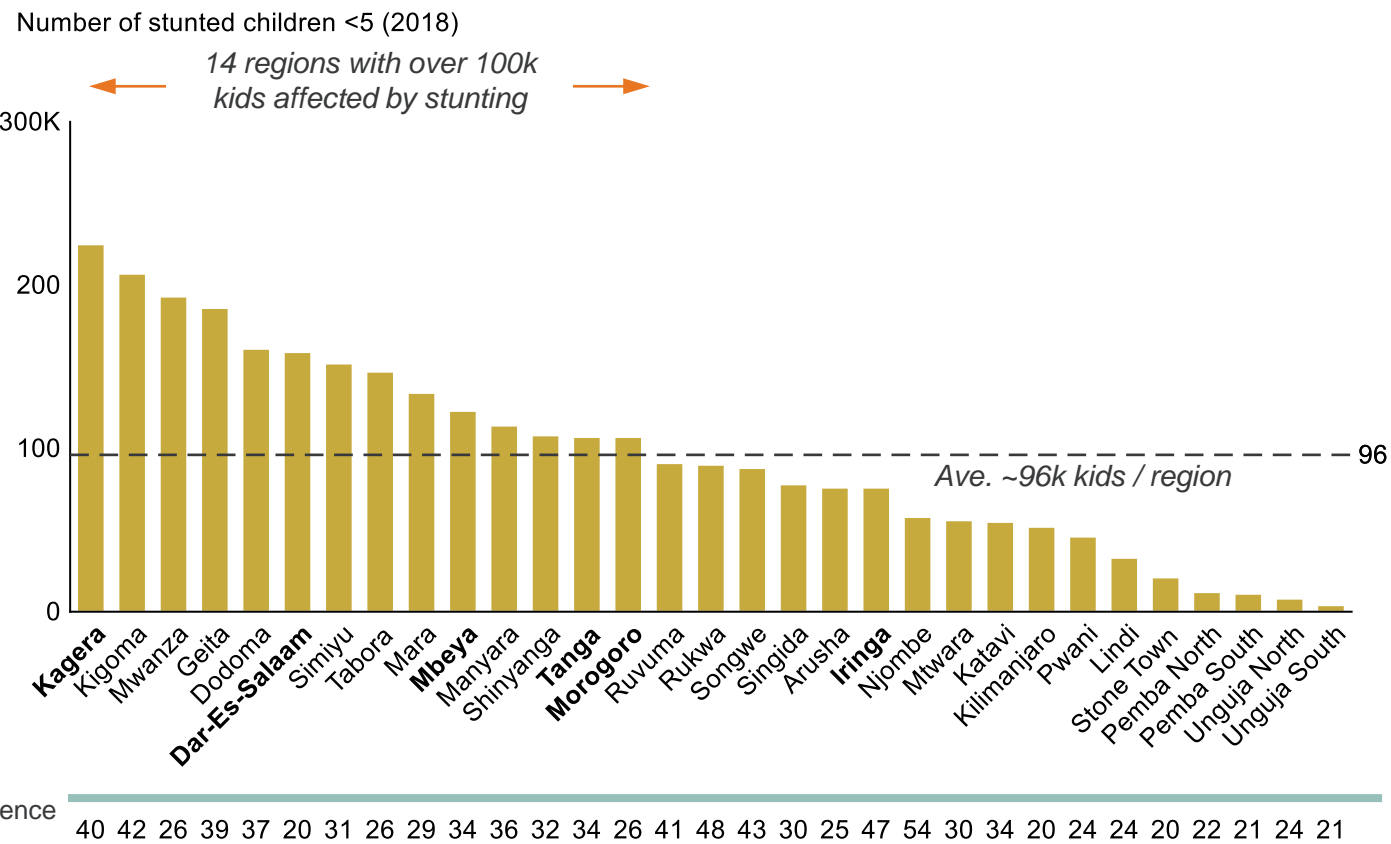
Demand | Tanzanian population has nutrition challenges that could be addressed through increased access and consumption of dairy products

NUTRITION

Western and central parts of Tanzania have significant stunting challenges...



...14 regions have over 100k children that are affected by stunting in their population



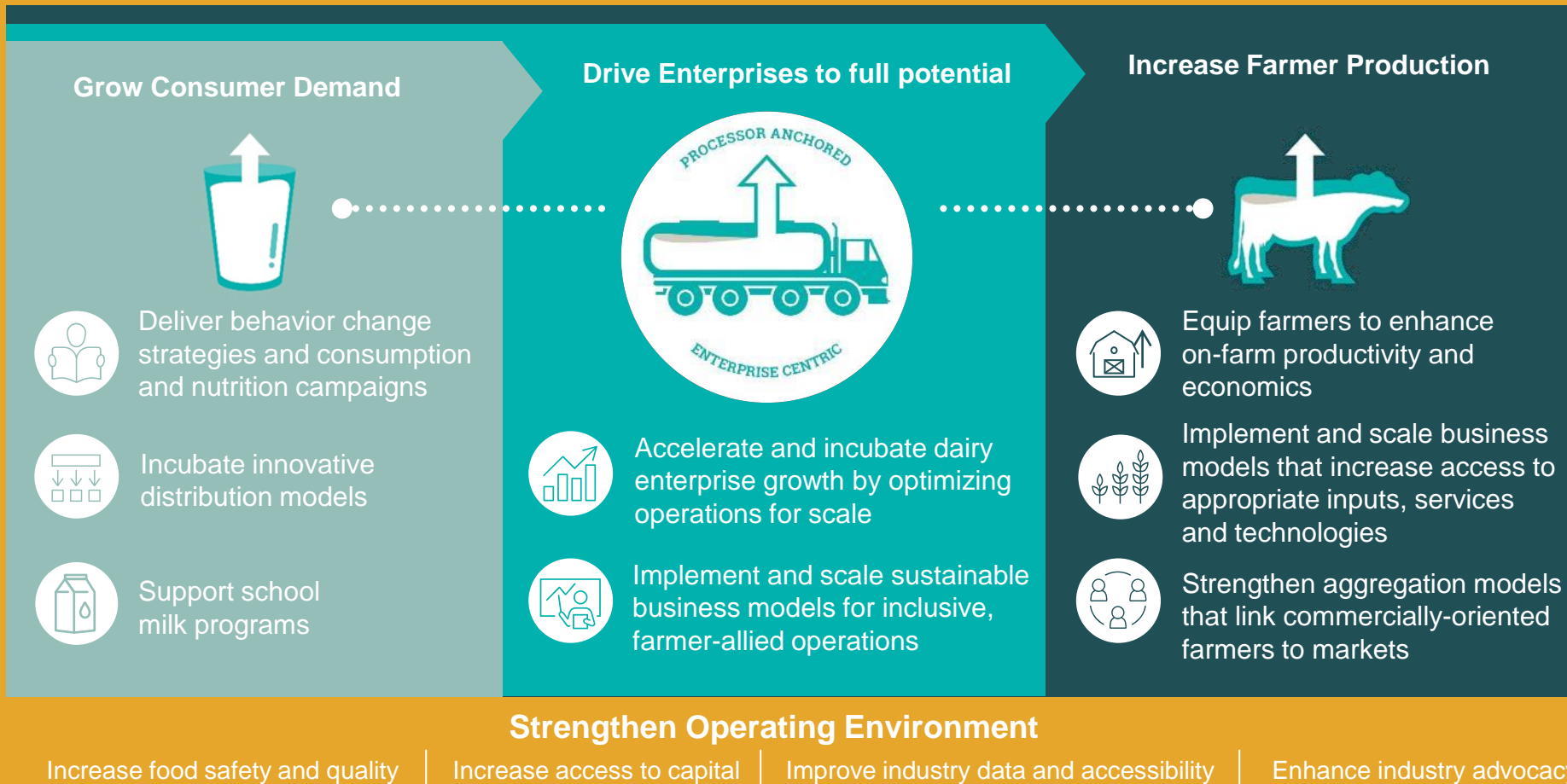
Source: Bain Analysis; TNNS Cross sectional household survey outputs (2018),

Prevalence %

40 42 26 39 37 20 31 26 29 34 36 32 34 26 41 48 43 30 25 47 54 30 34 20 24 24 20 22 21 24 21

How DNA will address these challenges – DNA strategic framework

Aligned with Government Priorities and Policy



Ambition

Transform African dairy industries by creating vibrant ecosystems of farmer-allied and environmentally sustainable enterprises that improve nutrition, enhance livelihoods, and stimulate economic growth.

DNA
Principles



Demand-led



Environmentally
sustainable



Agile and
adaptive



Gender and
youth inclusive



Data-driven



DNA Supports the Sustainable Development Goals



Growth through Nutrition Activity (GTN)

Dr. Getnet Assefa
Senior Technical Services Support Livestock Specialist
Venture37



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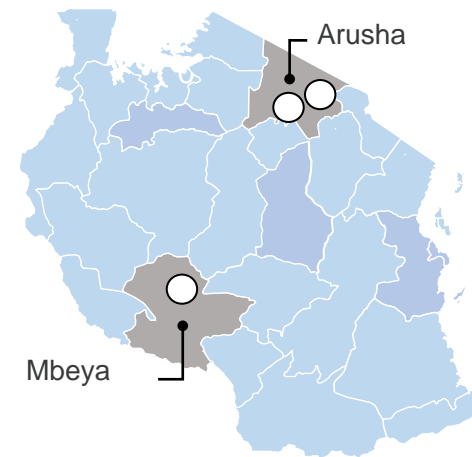
Demand generation | DNA has started implementing high-impact school milk promotions with three processors, targeting ~4,000 children across 20 schools

NUTRITION

Taking action with a data-driven, sustainable approach

- DNA commissioned a **study** to assess **dairy consumer demand** in Tanzania, which identified:
 - Need for a dairy **consumer awareness** campaign
 - **School milk consumption** has **lasting impact** on behavioral change in society
- DNA engages public & private sectors to ensure sustainability

DNA deploys processor-led school milk efforts



- Selected **three DNA processors** and identified target schools in their districts
- Trial of **innovative models** is aligned with Government of Tanzania priority of finding more sustainable mechanisms

Demand generation | Cont.

NUTRITION



Test viability for schools to grow demand

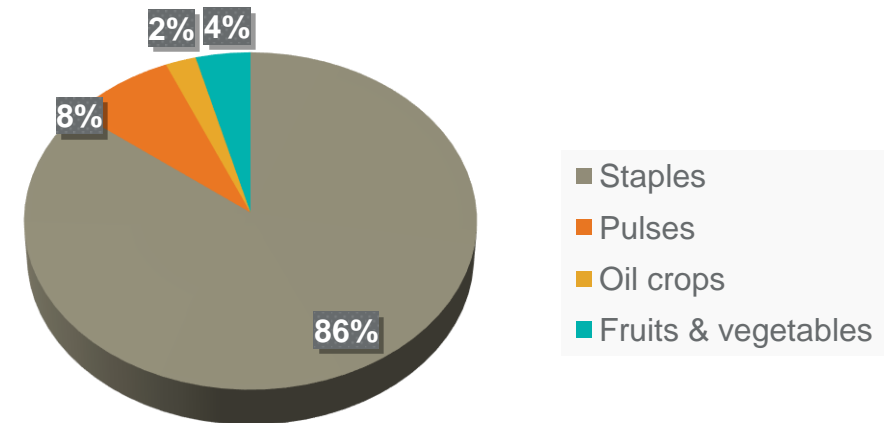
- We support processors to **test and iterate** on multiple models to grow demand:
 - Cost-sharing **equipment purchases**
 - Supporting design of **student nutrition curriculum / educational programming**,
 - Co-sponsoring **awareness and behaviour change campaigns**
- We engage ~20 schools **>4K children and >5K other community members**
 - Program will **measure reported changes in preferences** within community and provide feedback to processors to inform sales strategies

Why Growth through Nutrition works on access to ...

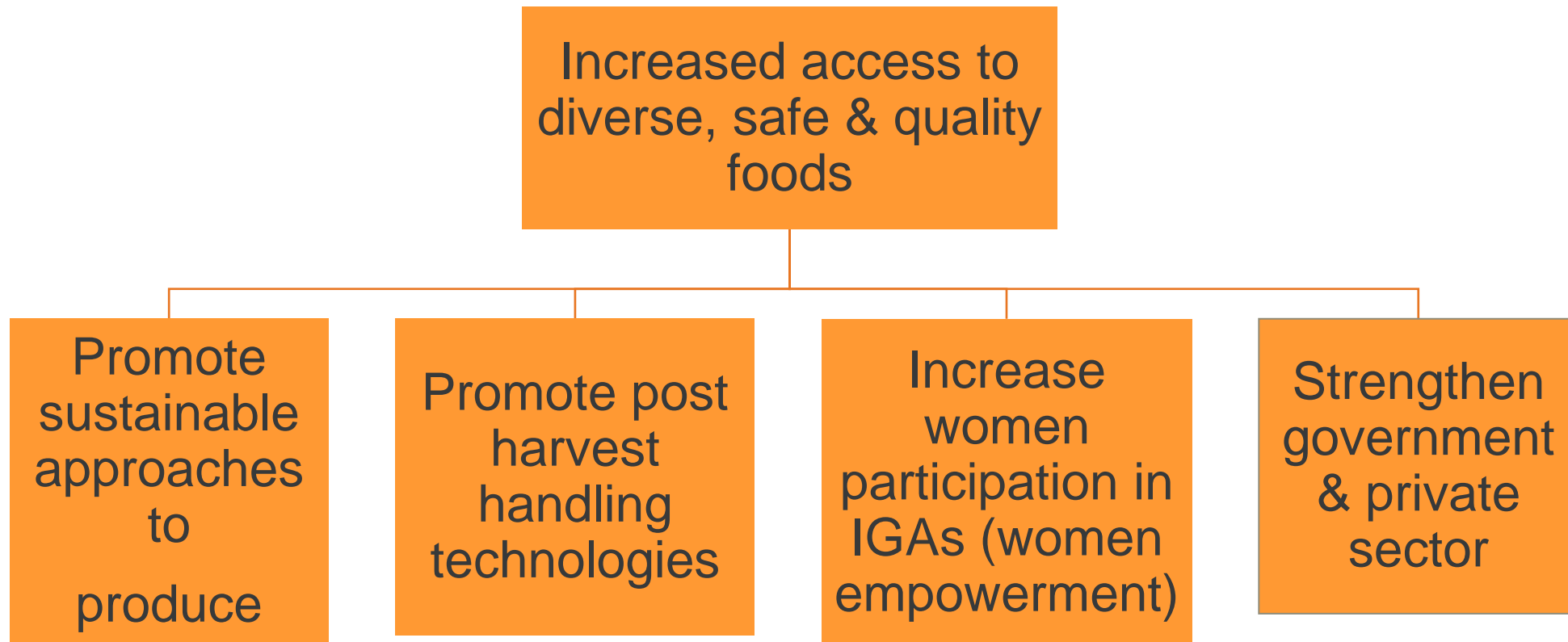
93% of children
<2 years did not
receive a MAD
(minimum acceptable diet)

57%
anemic

38%
stunted



GTN Intervention Pillars



Project Approach – Key use of Animal Sourced Foods (ASF) as part of Diversified Diet through promotion of Nutritional Sensitive Agriculture (NSA)

Measure of success – Reduction in MVHH Hunger from 48% to 11%



Project Approach – Focus on Local solutions – fertile hatching eggs, post harvest storage, savings and assets building

Measure of Success - Children who consumed 4 out of 7 food groups increased from 12% (2017) to 34% (2020)



Project Approach – Focus on improved access to nutritious foods

Measure of success – Women receiving diverse diets increased from 2% (2017) to 16 % (2021) – still a long way to go



"Chicken production is a science, to be successful I will teach the farmers before selling eggs and follow-up after."

– A Model Farmer



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Impact of *Girinka* program and *Gabura Amata Mubyeyi* (*parents, give milk*) intervention in Rwanda



Emily Ouma, Agriculture Economist, ILRI

July 7, 2021

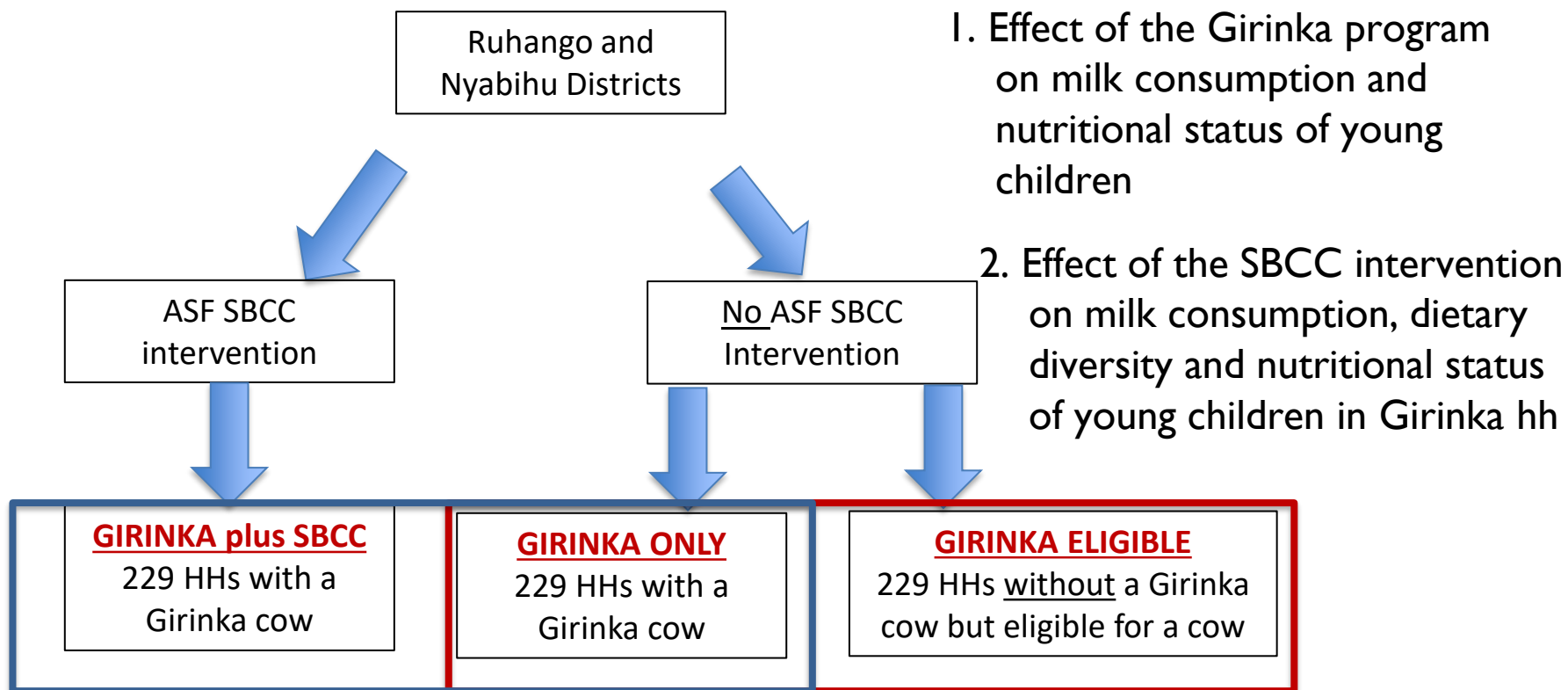


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EVALUATION DESIGN OF THE SBCC INTERVENTION - CLUSTER RANDOMIZED CONTROLLED TRIAL





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SBCC KEY Messages

The SBCC messages were developed for the following 6 key elements:

- Importance and **benefits** of cow's milk and ASF consumption for pregnant and lactating women and young children
- Appropriate daily **quantities** of ASFs and cow's milk for pregnant and lactating women and young children
- Appropriate **time to introduce** ASFs and cow's milk for pregnant and lactating women and young children
- Importance of identifying symptoms of **milk allergy** and intolerance and the actions to take
- Importance of **hygiene and safe handling & storage** of fresh milk
- Importance of **male engagement** for maternal and child nutrition and increase of cow's milk and ASF consumption



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KEY RESULTS

- Girinka program had a positive effect on child milk consumption, child nutritional status, and household food security

	Has Girinka cow (N=459)	Eligible for Girinka cow (N=223)	Difference (ATT)	SE
Child had milk 2 or more times in 7 days	43.1%	21.6%	21.6%***	0.044
Household food insecurity access score, range 0-27 (lower = more food secure)	12.4	13.7	-1.3***	0.813
<u>Measures of stunting and underweight</u>				
Weight-for-age z-score	-0.7 SD	-0.9 SD	0.2***	0.114
Height-for-age z-score	-1.7 SD	-1.9 SD	0.2**	0.141

** $P < 0.01$; *** $P < 0.001$; ATT, average treatment effect on the treated; SE, standard error

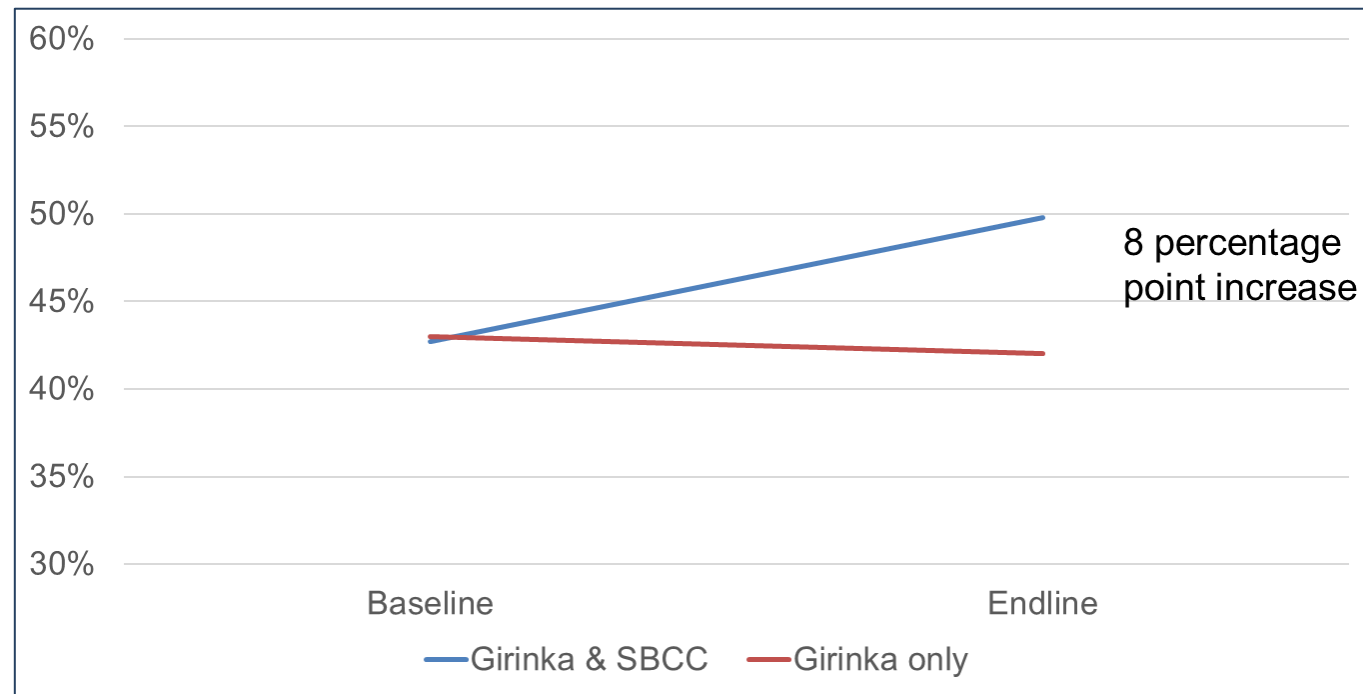


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KEY RESULTS

- *Gabura Amata Mubyeyi* (Parents, give milk) SBCC intervention:
 - Improved maternal knowledge of ASFs
 - Increased frequency of weekly milk consumption among children



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Effect of **Livestock Ownership** on Health and Nutritional status of women and children Low and Middle-income settings

TADDESE ALEMU ZERFU, MPH; PHD

TRAIN@Ed Marie Skłodowska-Curie Actions Research Fellow

[Global Academy of Agriculture and Food security](#) (GAAFS)

University of Edinburgh (UoE), UK

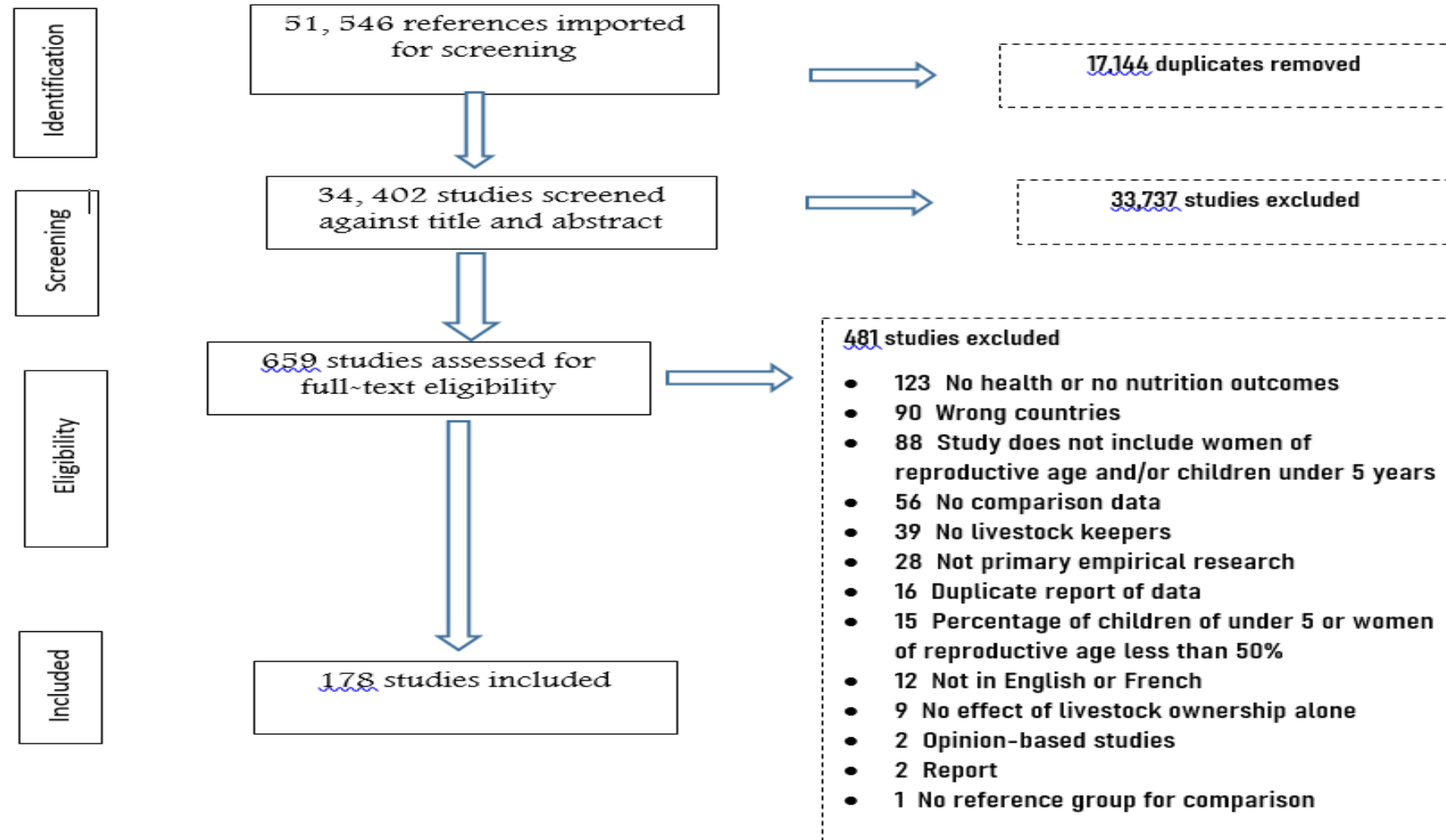


Rationale

- Despite well known benefits, there are evidence on contradicting impacts of livestock keeping on the health status of children and women,
 - Mainly through contamination and exposure to microbes
- Yet, there is limited synthesized evidence elucidating the effect of livestock keeping on health and nutritional outcomes of vulnerable population groups
- This systematic review
 - searched 24 scientific databases (key words)
 - two reviewers screened all titles/abstracts & full texts to avoid possible biases
 - Data extraction - 1 reviewer, checked by another

From more than 50,000 studies to 178...

PRISMA flow diagram reporting the various studies



Adverse Health Effects

- Acute gastrointestinal illness
- Ancylostoma ceylanicum
- Asthma
- Brucellosis
- Sickness in children (several infections)
- Campylobacter, Campylobacter-associated Diarrhoea
- Child diarrhoea
- Child anaemia
- Cryptosporidium Diarrhea in Early Childhood
- Coxiella burnetii
- Crimean Congo Hemorrhagic Fever Virus
- Dengue fever
- Diarrhea
- Enterotoxigenic Bacteroides fragilis (ETBF) related diarrheal
- Genomic Toxoplasma gondii DNA and Anti-Toxoplasma Antibodies
- Flulike illness
- Giardia
- Human fascioliasis infection
- Leishmania donovani infection
- Helminth infections
- Intestinal protozoan infections (Giardia duodenalis, Entamoeba histolytica, Cryptosporidium, Ascaris lumbricoides, Schistosoma mansoni, Hymenolepis nana and Enterobius vermicularis).

Nutrition Outcomes

- Child wasting ● ● ○ ○ ○ ○ ○ ○ ○ ○
- Child severe protein malnutrition ○
- Child stunting (HAZ) ● ● ○ ○ ○ ○ ○ ○ ○ ○
- Child weight and height growth ● ○ ○ ○
- Child nutritional status ● ○ ○ ○ ○ ○ ○
- Anemia of women ● ● ○ ○ ○
- Child WHZ, WAZ, and HAZ indices ● ○ ○ ○ ○ ○ ○ ○
- Child Zinc deficiency ○

- Positive association
- No (neutral) association
- Negative association

Each Dot = Two articles
Half (○) = One article



Panel Discussion

A chicken enterprise of Tanzania's Elizabeth Swai.
Photo credit: ILRI: Stefano Bianco

Leveraging Livestock to Combat Malnutrition: Perspectives from East Africa



David Harvey
Technical Director
Venture37

Leveraging Livestock to Combat Malnutrition: Perspectives from East Africa



Isabelle Baltenweck

Program Leader, Policies, Institutions and
Livelihoods

International Livestock Research Institute



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