Preventing farmer – herder conflict and deaths with strategic supplementation and milk collection from pastoralists

MD Abubakar and Gbola Adesogan

L and Z Integrated farms, Kano, Nigeria

Global Food Systems Instititut, IFAS University of Florida

L&Z

UNIVERSITY OF FLORIDA
Institute of Food and Agricultural Sciences

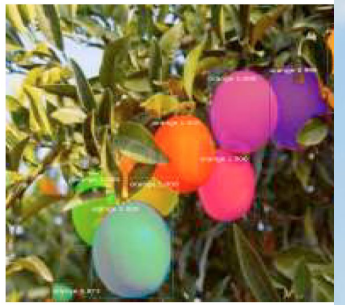
Outline

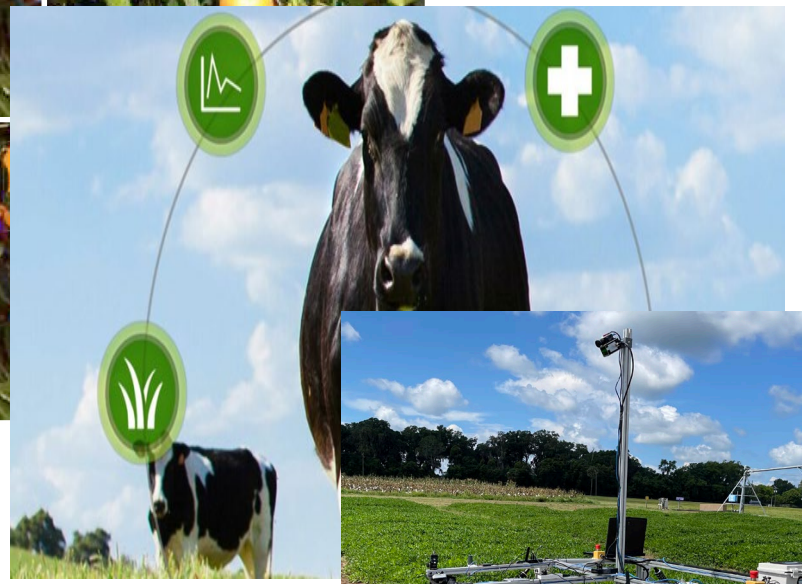
- Stark farming
- Global undernutrition
- ASF – the brain foods: importance, challenges, interventions
- Preventing farmer-herder conflicts
- Conclusions

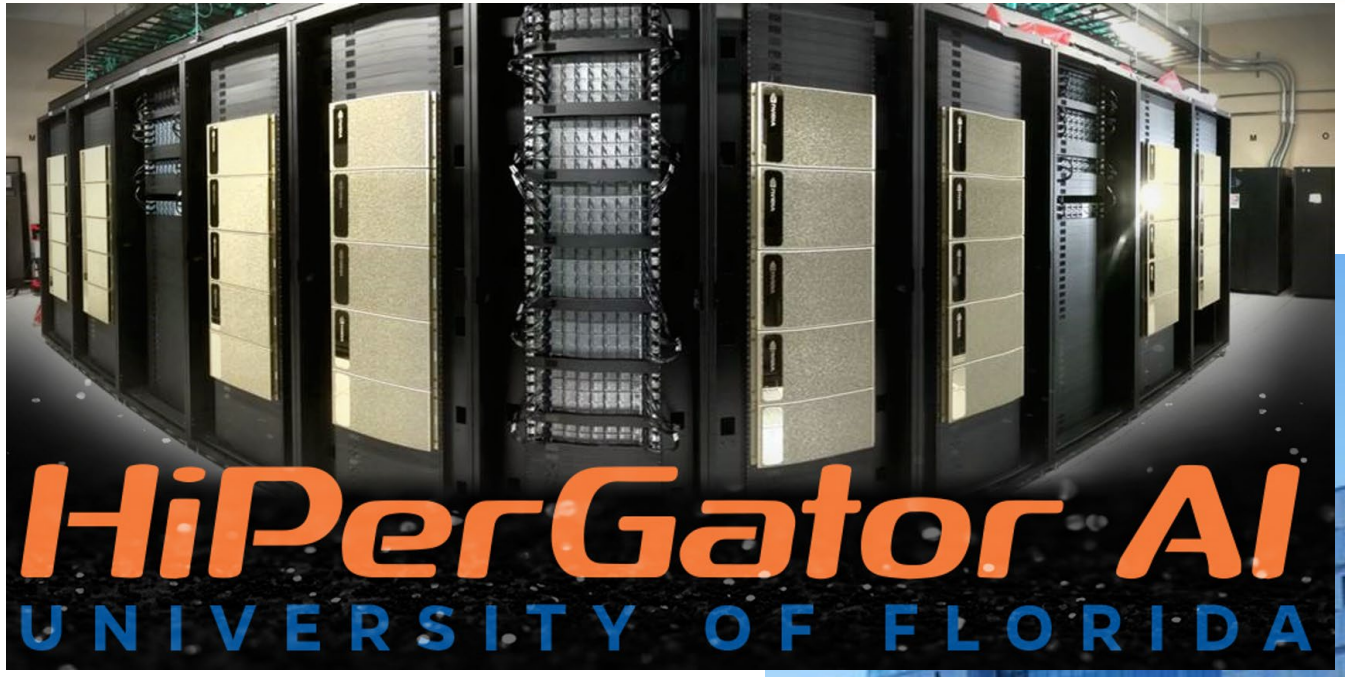
Stark farming; how much longer?

Farming in the Global North

- Stara sprayer with ONE SMART technology







- Fastest supercomputer donation
- 100 new AI profs hired
- 230 AI-related colors
- $30 million AI for agric. center

Farming in the Global South

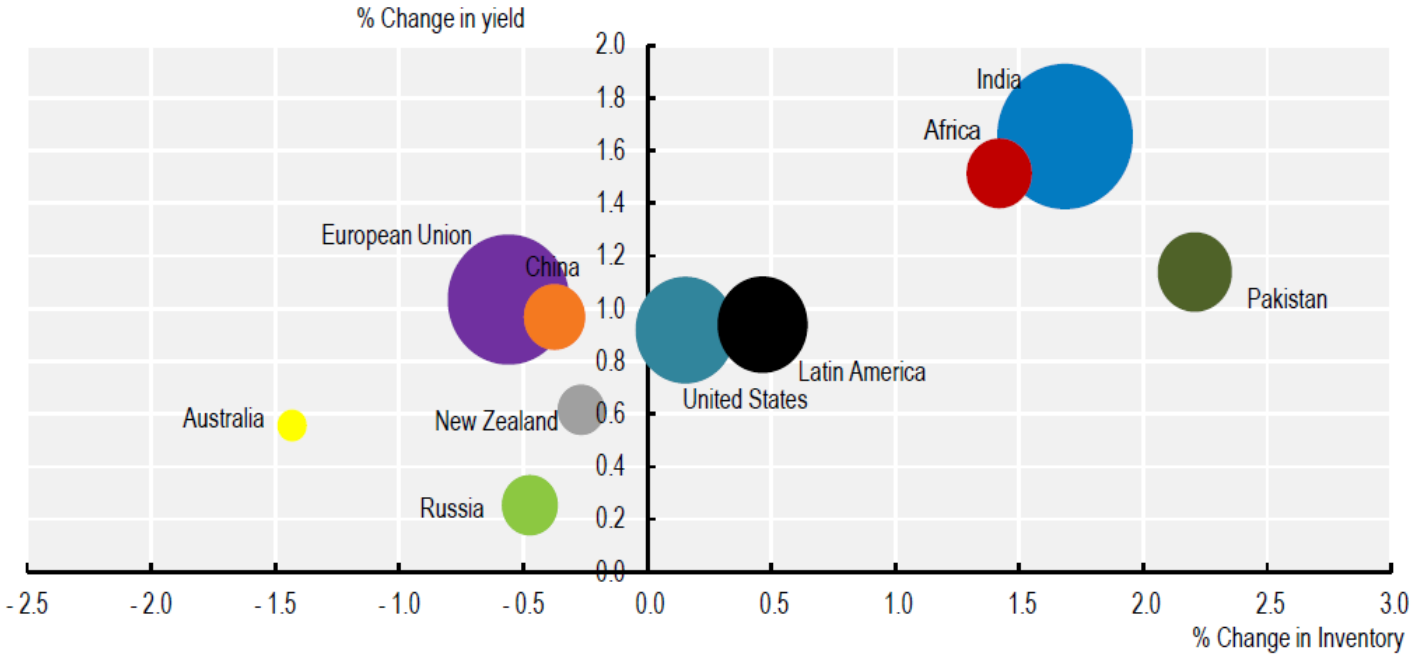
Global milk production growth will be greatest in LMIC

BY 2030,

- Dairy production will grow by +64% in South Asia, +36% in Africa and +33% in Latin America relative to 2019 - 2021.
- 25 to 60% more dairy products will be in demand in emerging countries
- LMIC will consume 67% of the fresh dairy products.

(Westebrink et al., 2019)

Annual changes in inventories of dairy herds and yields between 2021 and 2031

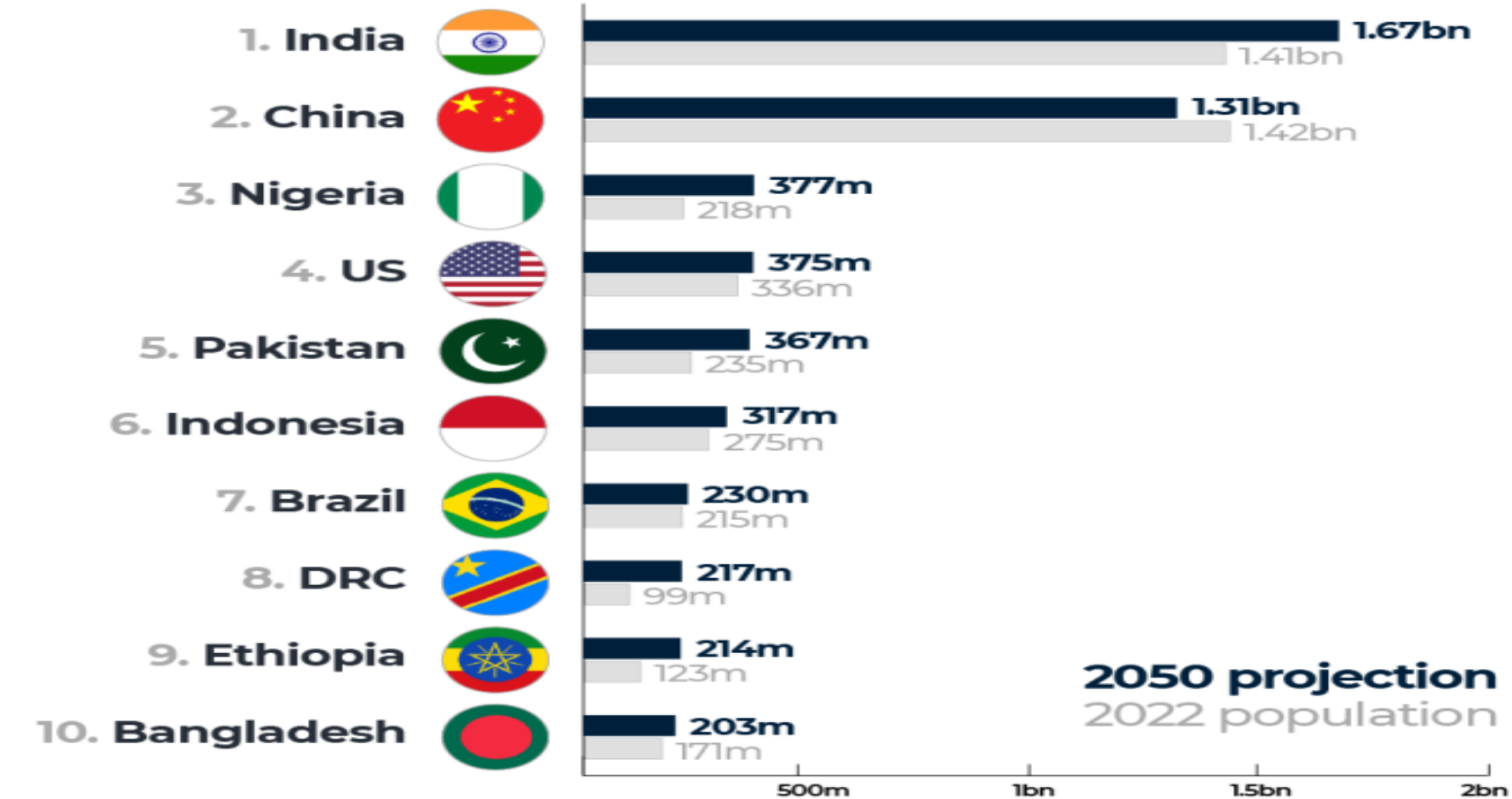


Bubble size indicates yield in the base period 2019-21.

(OECD/FAO, 2022)

Most populous countries by 2050

The world's population is expected to reach 9.7 billion by 2050, as per UN projections.



Source: UN Population Division (2022) | July 11, 2023

@AJLabs ALJAZEERA

Global undernutrition

Stunting (hidden hunger): The Preventable Tragedy

- Undernutrition kills 45% of children under 5; 148 million of them are stunted
- Impairs cognitive and motor development and is intergenerational
- Increases incidence of chronic diseases
- Reduces national GDP by 7–16%

WHO
Horton and Ross 2003; Martorell 2010

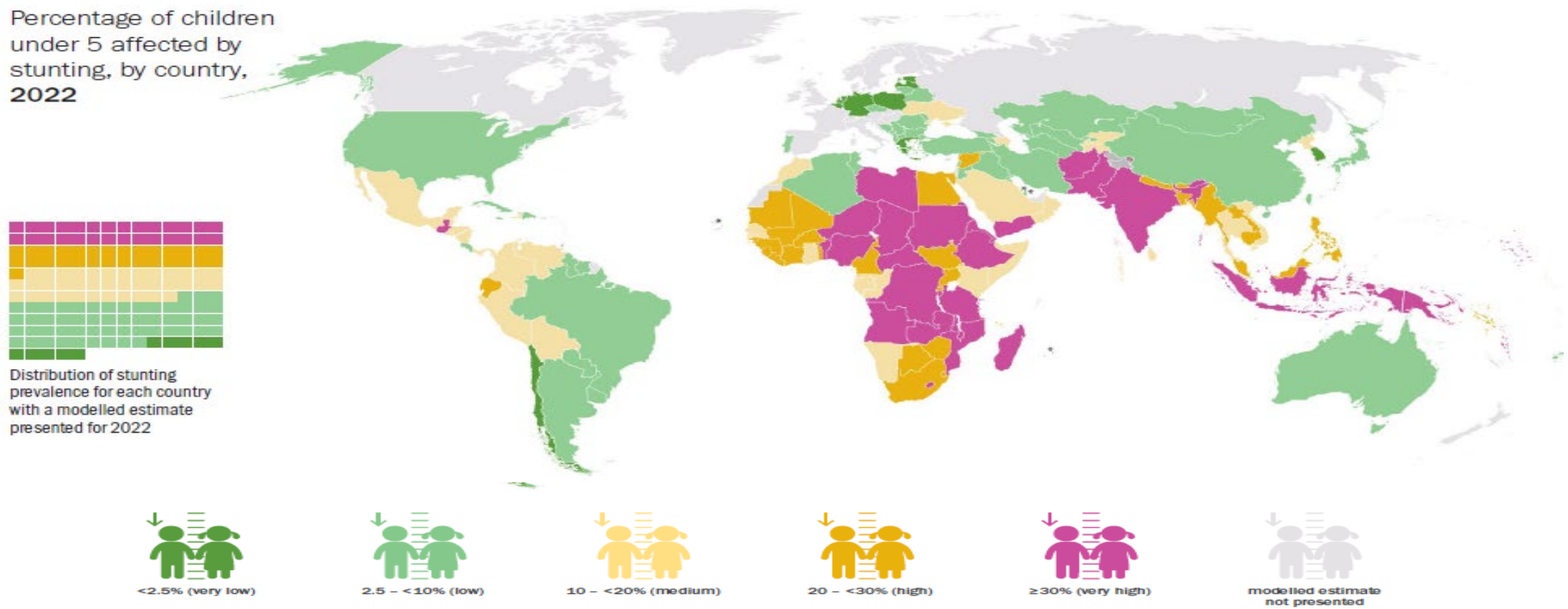
www.isotekindo.co.id

1 in 3 children is stunted in sub-Saharan Africa and South Asia

Childhood malnutrition costs
$20–30 billion

(UNICEF, WHO, World bank, 2019)

Global prevalence of stunting, %

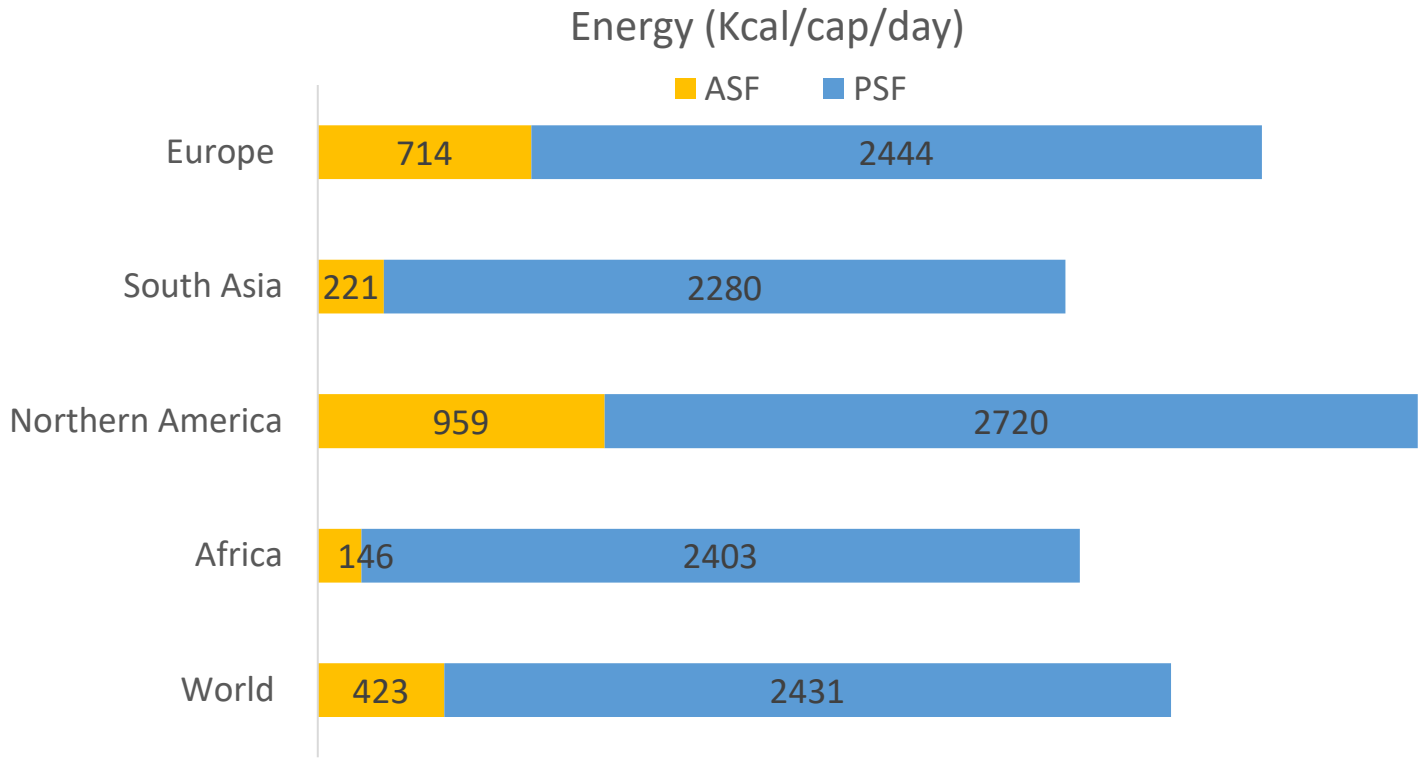


1 in 3 children was stunted in sub-Saharan Africa and South Asia

Risk of child mortality is **eight times** greater in African than Europe (WHO, 2016)

(UNICEF, WHO, World bank, 2023)

Global plant (PSF) vs. Animal (ASF)-sourced food consumption



Hidden hunger is prevalent in the developing world, where most people are vegetarian (not by choice)

(FAO, 2021)

Stark differences in global milk consumption by region/country (kg per person /year)

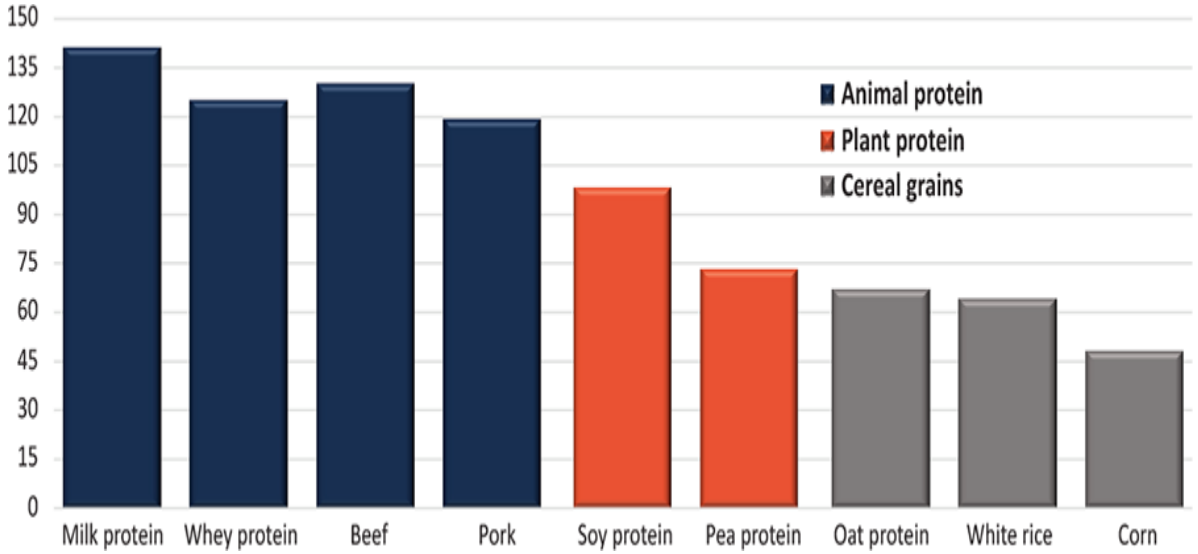
Scare them!!!

ASF consumption levels by Rwandan children

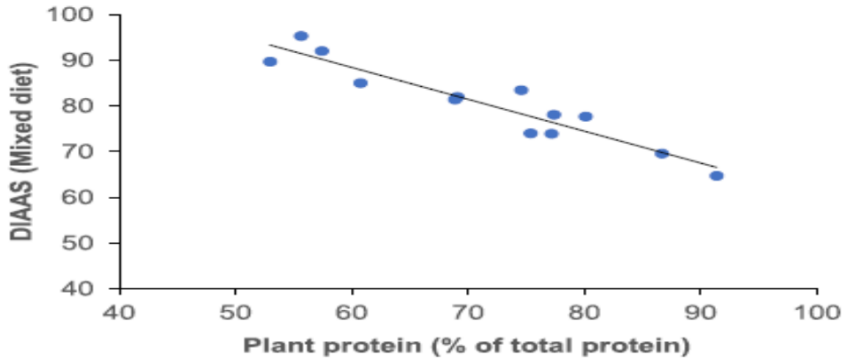
- Meat 17%
- Eggs 6%
- Milk 2.5%

(NCDA, 2025)

Digestible amino acid score of different food items



DIASS decreases as the proportion of plant protein in a diet increases



(Bailey and Stein, 2019; Moughan 2021)

Animal-Source Foods: bioavailable nutrient cluster and undernutrition solution

Superior-quality (ideal) protein

Higher energy density

Higher nutrient density and bioavailability

Nutrient	Advantage vs. plant-source food
Protein	Higher quality/complete
Iron	Only dietary source of bioavailable haem
Zinc	More bioavailable
Calcium	More bioavailable
Vitamin B12	Only dietary source
Vitamin A	Only preformed source (retinol); more bioavailable
Vitamin D3	Only dietary source; more active and bioavailable than D2
Choline	Main dietary source
EPA and DHA	Main dietary source
Thiamin, riboflavin, Vitamin B6, E	

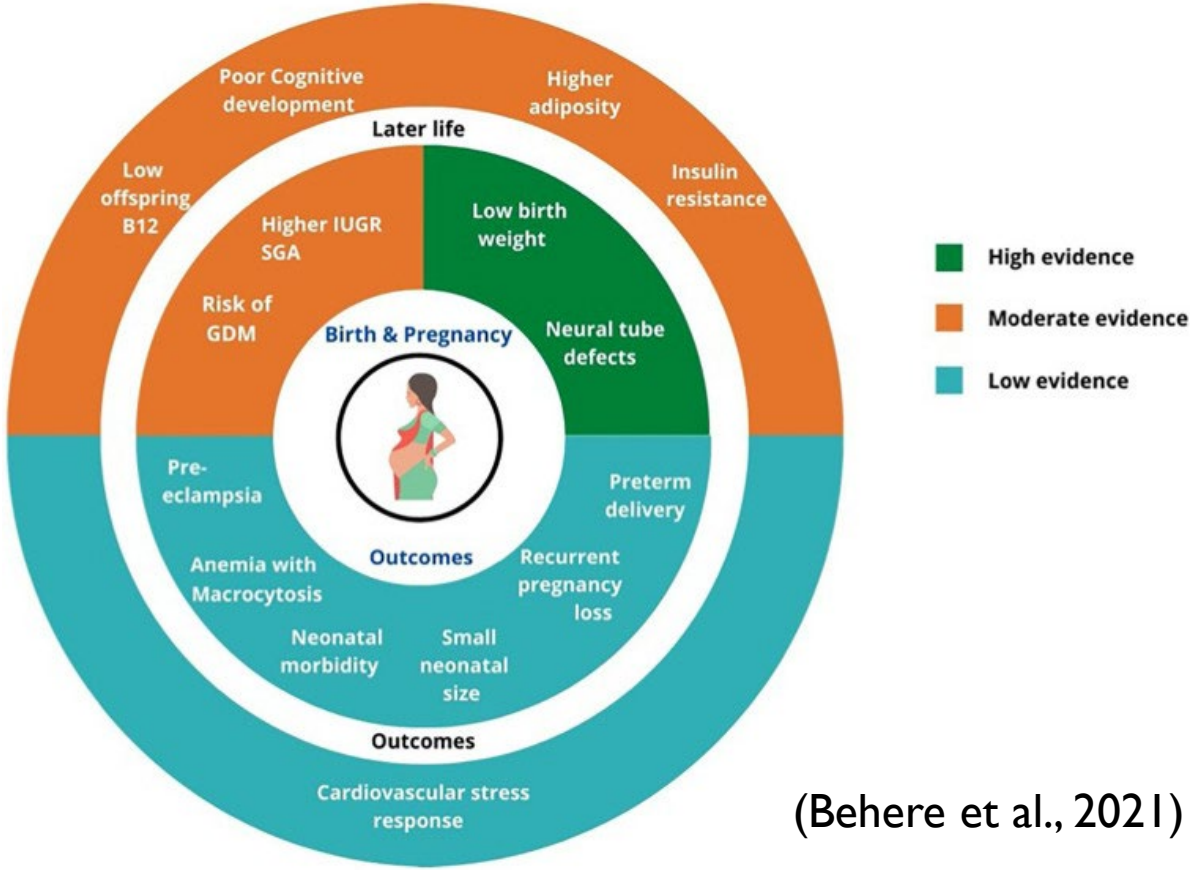
Allen et al.*, 2019; Beal* et al.*, 2020*

Importance of ASF in pregnant /lactating women

Pregnant and lactating women

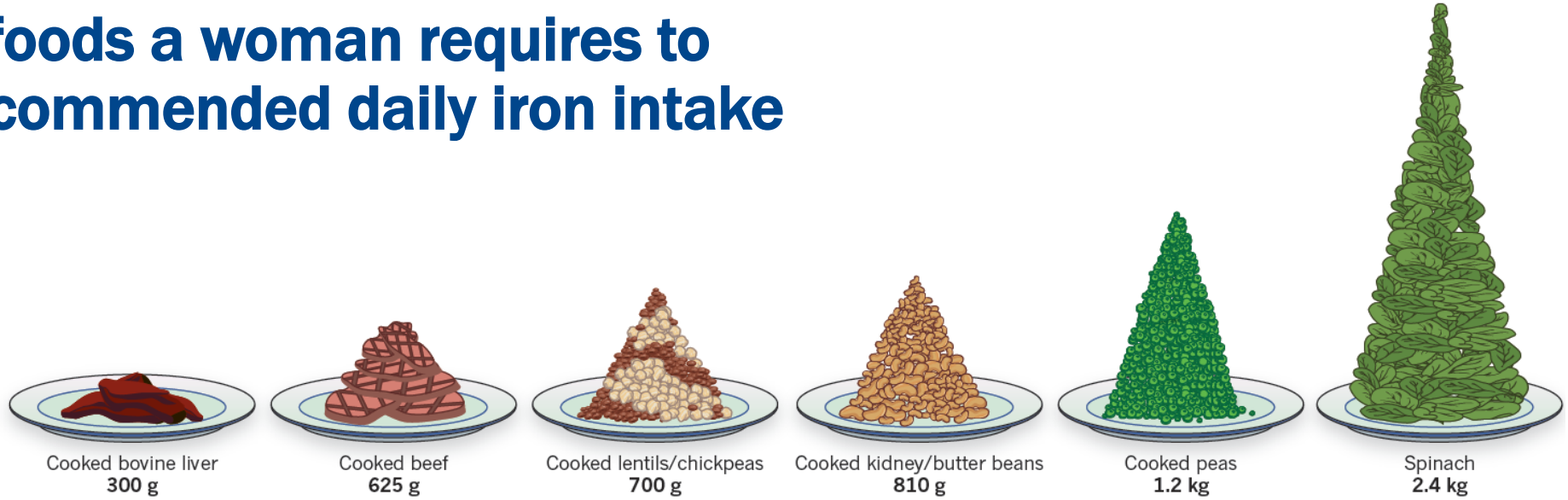
- Prevent anemia
- Prevent birth defects
- Prevent childhood stunting, wasting and underweight
- Prevent childhood cognitive impairment

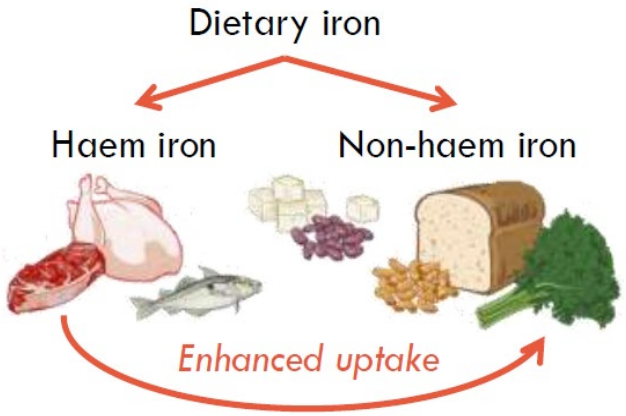
Associations of low maternal vitamin B12 and pregnancy and offspring health outcomes



(Behere et al., 2021)

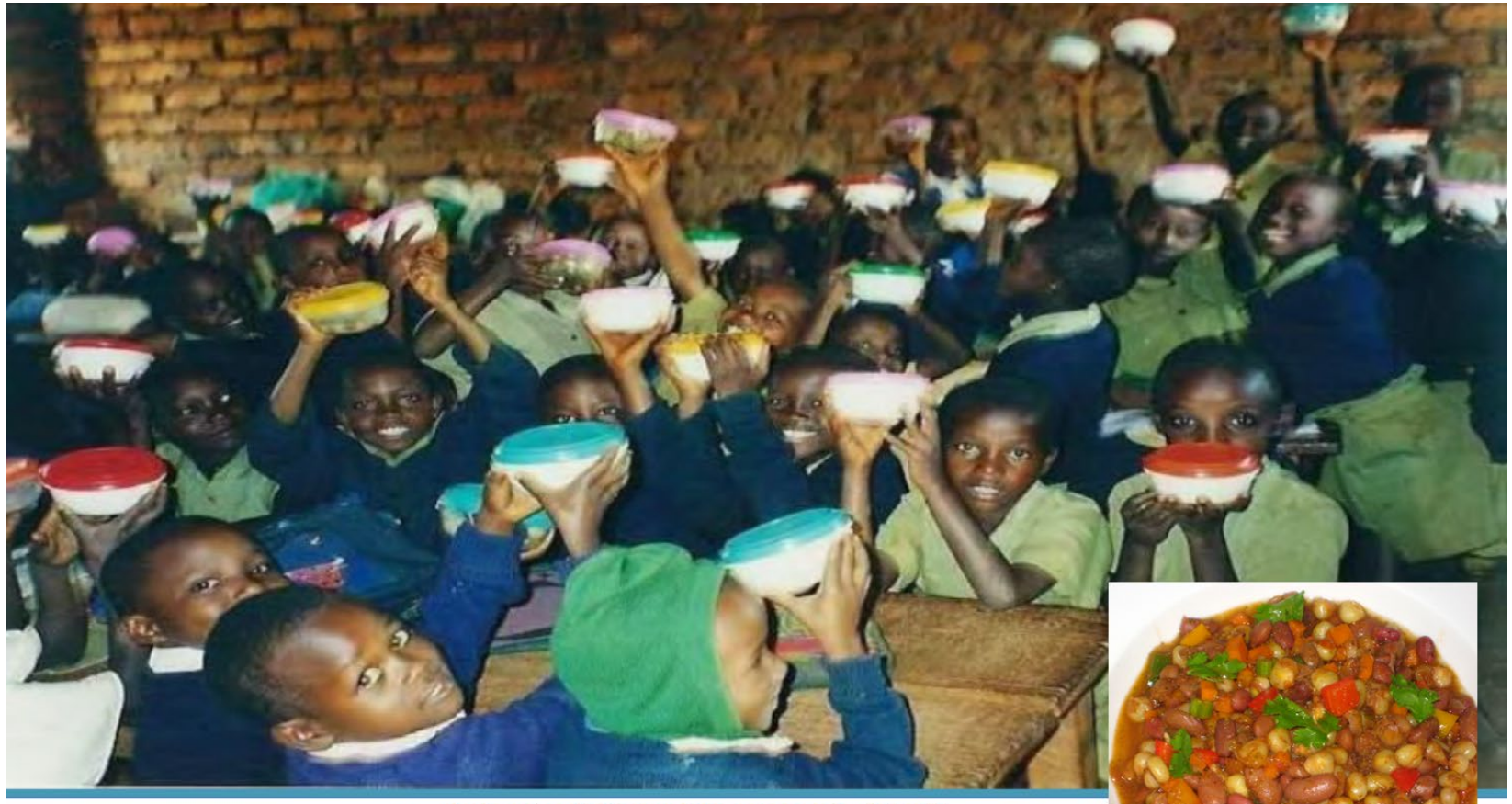
Quantity of foods a woman requires to meet the recommended daily iron intake (18 mg)





(Gupta, 2012; Dominguez-Salas and Bruyn; Beal et al.*, 2020; Neumann* et al.*, 2002)*

Life changing study



- Adapted from Demment, 2013

USAID
FROM THE AMERICAN PEOPLE

UNIVERSITY of FLORIDA

Kenya school feeding study

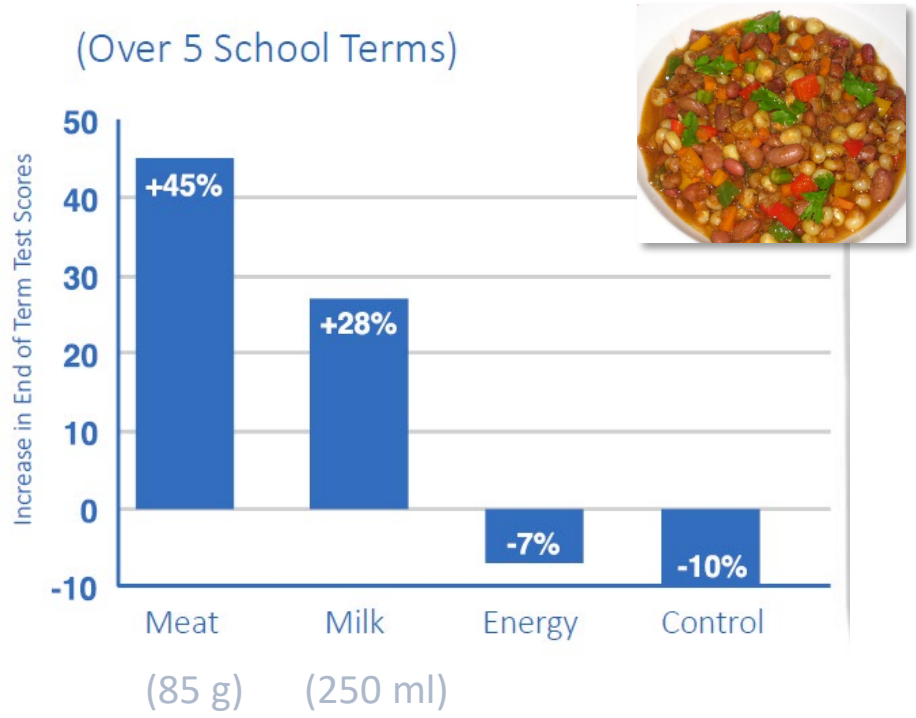
Embu Kenya, 2 years; 7–10-year-olds; n=554.

Meat improved:

- Cognitive performance (Raven's, math)
- School test scores
- Physical activity, initiative and leadership
- Arm muscle mass, B12 status

Milk improved:

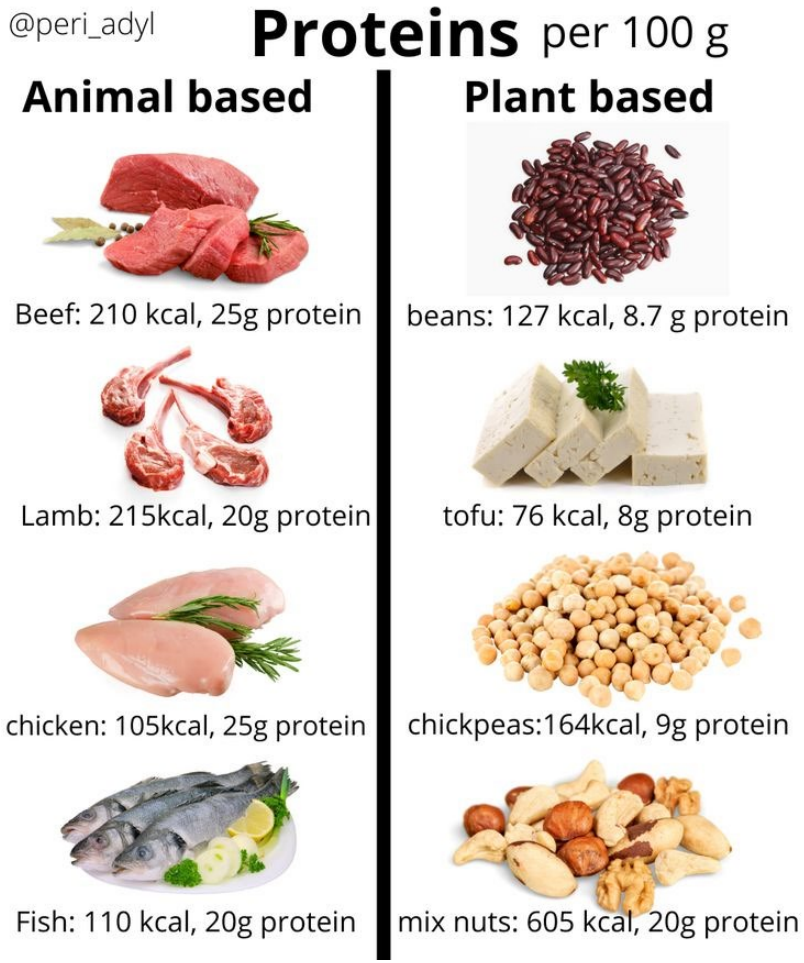
- Linear growth if stunted
- B12 status



Neuman et al., 1997; Hullet et al., 2014

Dangerous misnomers

~~Animal protein industry~~



Brain super-foods

(Ensure, 2025)

If it is plant-based, is it milk?

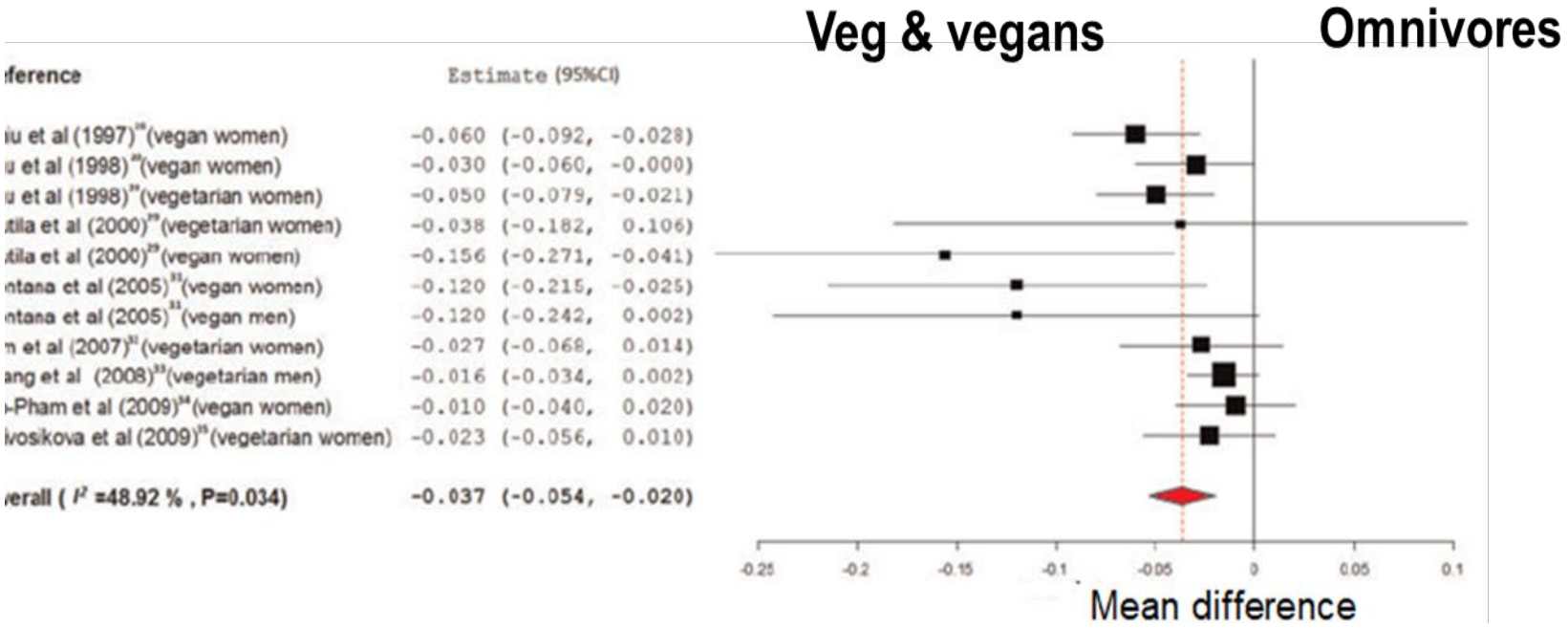
https://www.veganfoodandliving.com/

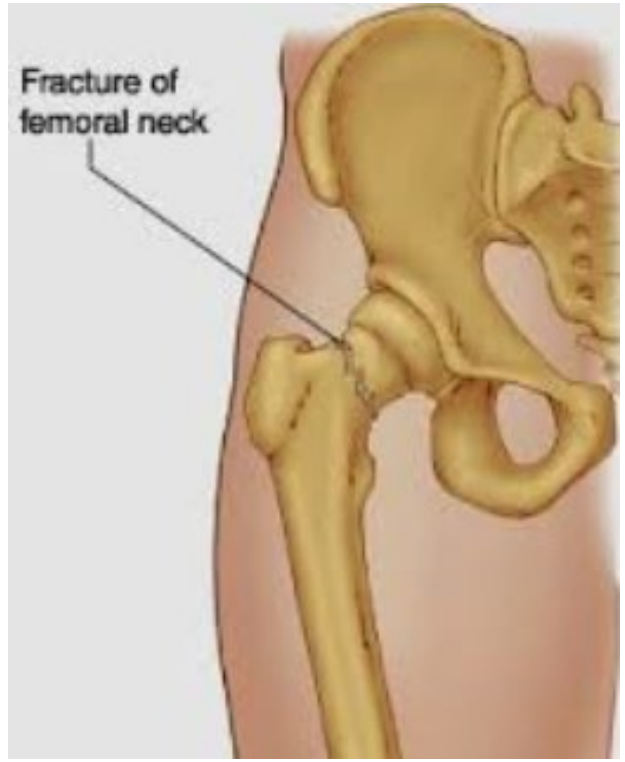
FDA Definition

Milk is the lacteal secretion, practically free from colostrum, obtained by the complete milking of one or more healthy cows.

Importance of ASF in the elderly

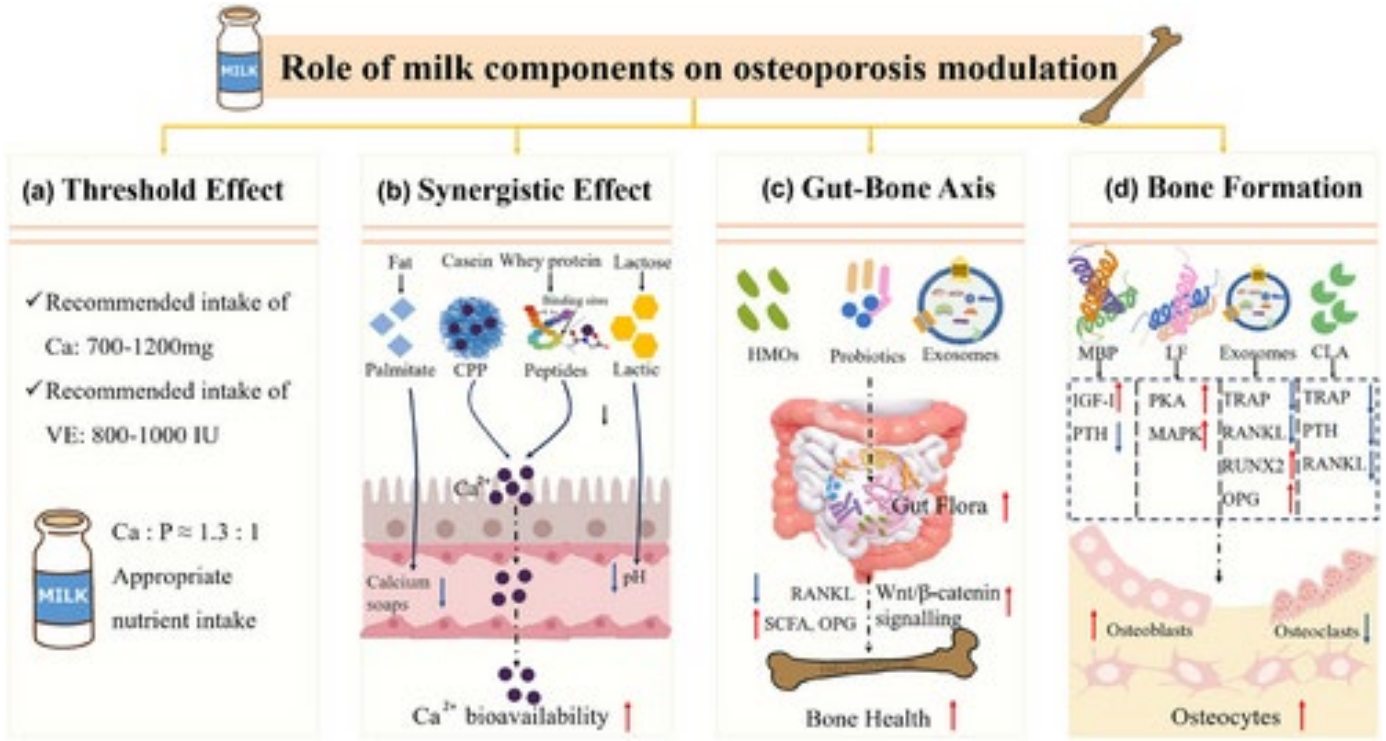
- Prevent loss of muscle mass / prevent sarcopenia
- Prevent loss of bone mass and density





Iguacel et al., 2019

Multiple milk components aid bone integrity



- **Lactose, proteins, and vitamins, fatty acids, oligosaccharides, and exosomes** in milk, all work together with calcium to enhance its bioavailability and utilization

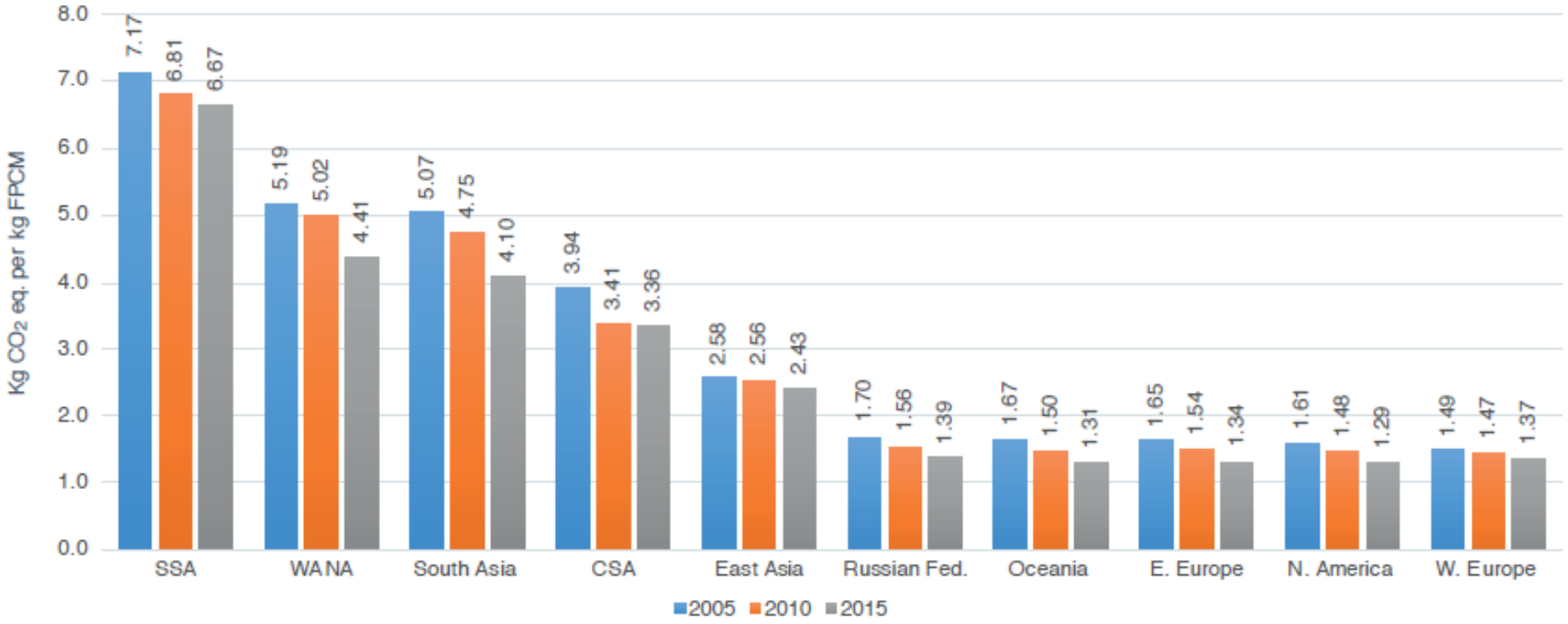
- New emphasis on revisiting and re-examining the clustering effects of such nutrients

Wang et al., 2024

Barriers to ASF consumption

- Sociocultural factors
  - Gender
  - Caste
  - Religion
  - Cultural taboos
  - Fads
- Biases (crops, fortificants)
- Perishability
- Availability (low livestock productivity)
- Affordability
- Accessibility
- Conflict

Emissions intensity trend by region



(FAO, GDP, 2019)

Crop residues dominate Global South ruminant diets

Cactus for dryland livestock production and improved livelihoods in Kenya

Jose Dubeux
Professor and Assoc. Dept Head

FEED THE FUTURE INNOVATION LAB FOR LIVESTOCK SYSTEMS

Vision: To sustainably intensify livestock production to improve the nutrition, health, incomes, and livelihoods of vulnerable people

Scope: Have managed over 60 field-to-fork research for development over 7 years

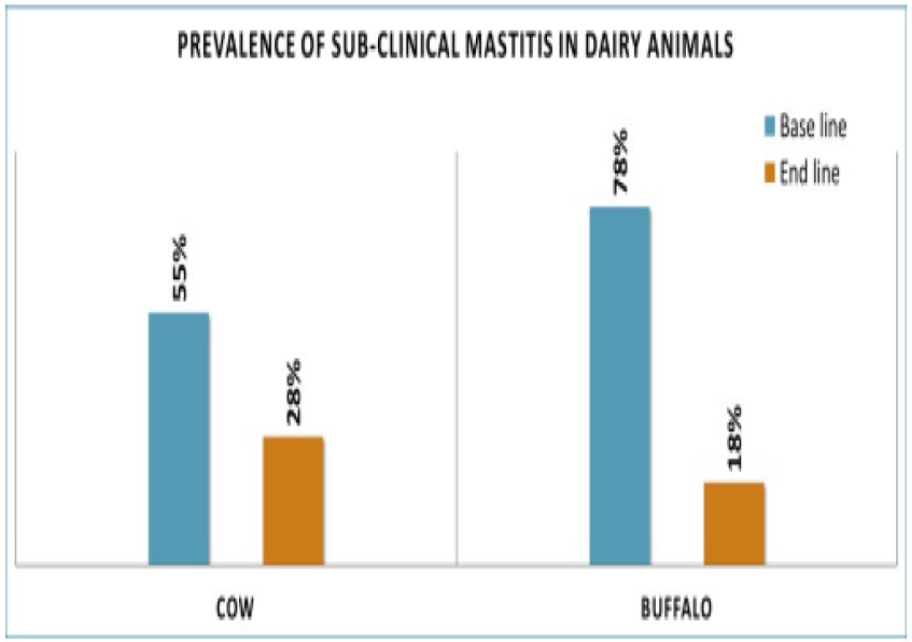
Several focused on addressing prioritized problems in the dairy industry

Countries:

- Phase 1 (2015-2020) : Burkina Faso, Niger, Ethiopia, Rwanda, Nepal, Cambodia, Kenya, Uganda
- Phase 2 (2020-2025) : Burkina Faso, Niger, Ethiopia, Rwanda, Nepal, and Nigeria

Reduced mastitis prevalence

We reduced the prevalence of mastitis (udder inflammation) by **96%** in cows and **333%** in buffalo.

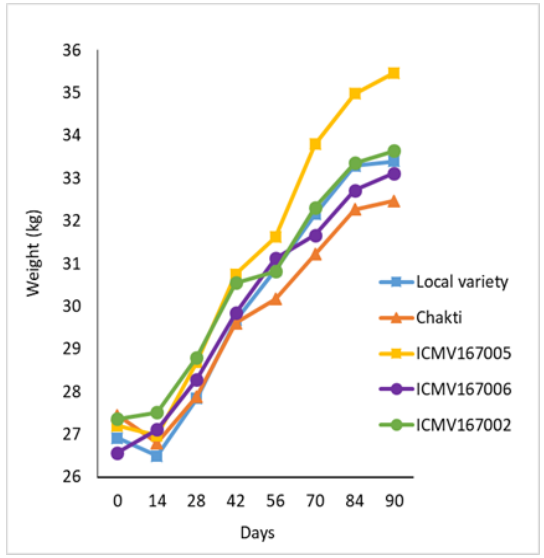


(Sah et al., 2020)

Photo credit@Hiefer Intern

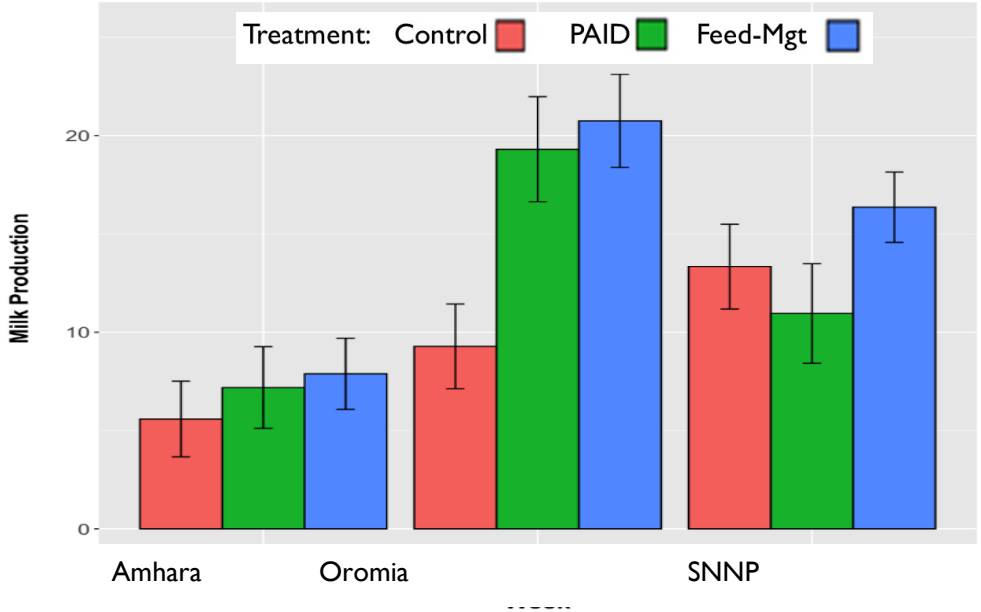
Increased livestock productivity

Niger



Increased sheep growth with improved forages

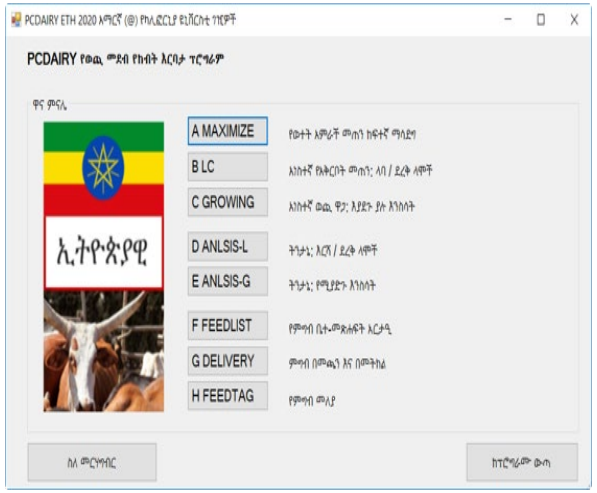
ETHIOPIA

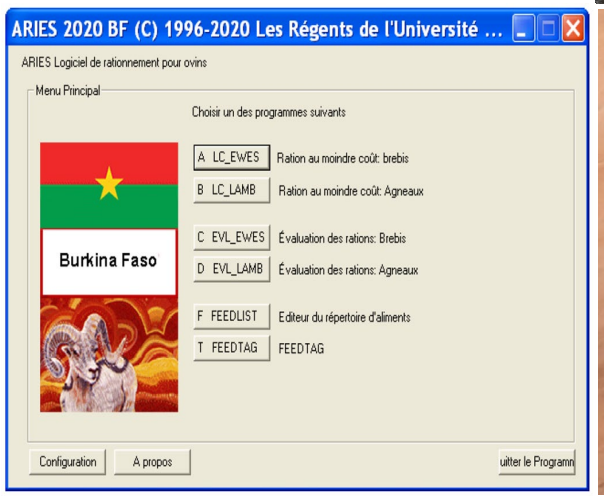


Increased milk production by 50% by better feeding and management

Developed and disseminated apps for better feeding, tech for measuring GHG emissions

- Introduced state of the art green feed machines to ET & BF for precise emissions measurements
- Trained technicians, researchers, farmers private sector, extensionists to use them
- Creates business opportunities for entrepreneurs

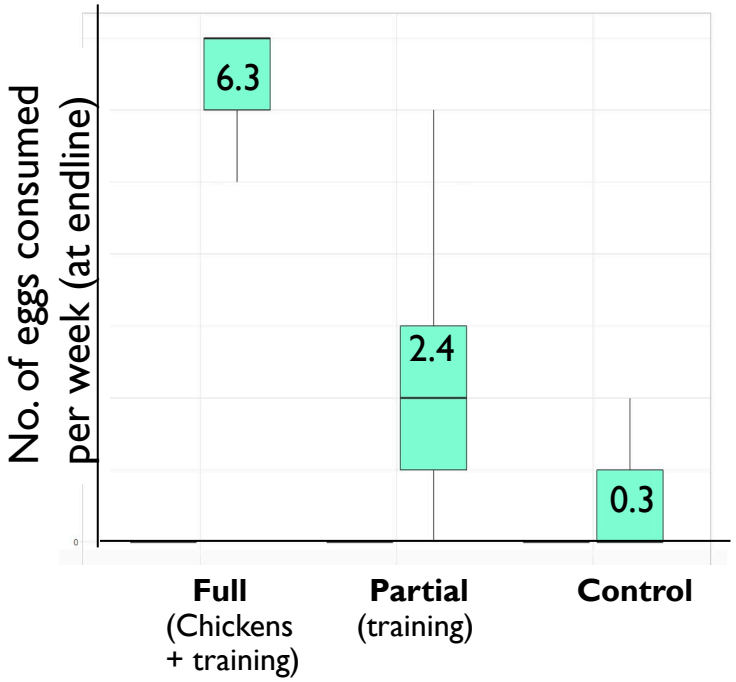




Improved nutrition

Our intervention

- Increased egg intake in children from 0 to 6 per week
- Reduced wasting and underweight
- Increased women's decision-making power



Baseline egg consumption was zero.

Mckune et al., 2020

BURKINA FASO

Milk AFM1 standards have caused milk avoidance, dumping and related challenges

- **Balkans –** High milk AFM1 levels led to widespread dumping of milk, closure of dairies
- **Ethiopia-** Social media article about milk AFM1 nearly crippled the nascent dairy industry
- **Nepal –** Milk holidays (dumping) are common despite huge neighboring markets
- **Kenya-** if aflatoxin standards were strictly enforced, 3,400,000 Kenyans would be deprived of milk (Sirma et al, 2018).

AFM1 causes 13-32 liver cancer cases/year: 0.0003% of all cases

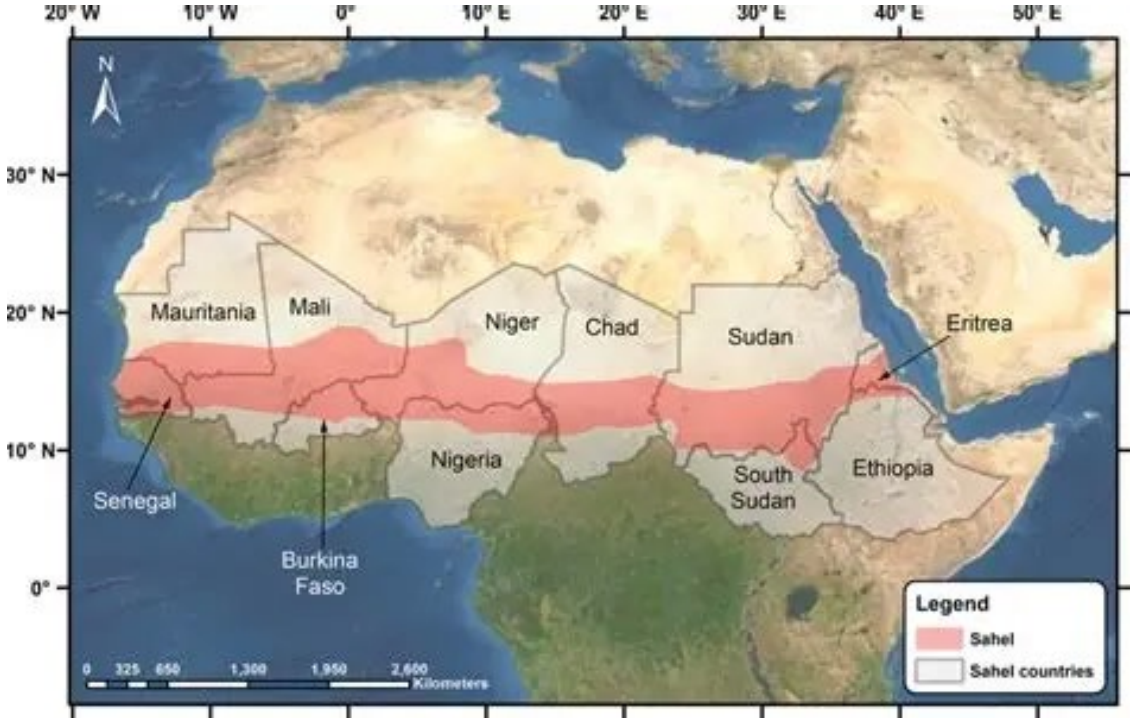
- Most nations would have no AFM1-related liver cancer cases

Nation	AFM1-related HCC cases/yr
Brazil	0.5 - 7
India	4 – 9
Indonesia	0.2 – 5.6
Mexico	3 – 5.4
Pakistan	1.6 - 4

Farmer-herder conflicts in Nigeria

- Over 60,000 people have been killed and millions displaced in Nigeria since 2001.
- Caused by farmer-herder conflicts prevalent in over 60% of the states.
- Similar violence and deaths in most West African countries.

The West African sahel



- The climate is arid and hot, with strong seasonal variations in rainfall and temperature.
- Receives about 200-800 mm (8-32 in) of rainfall a year, which falls mostly in the May to September monsoon season.

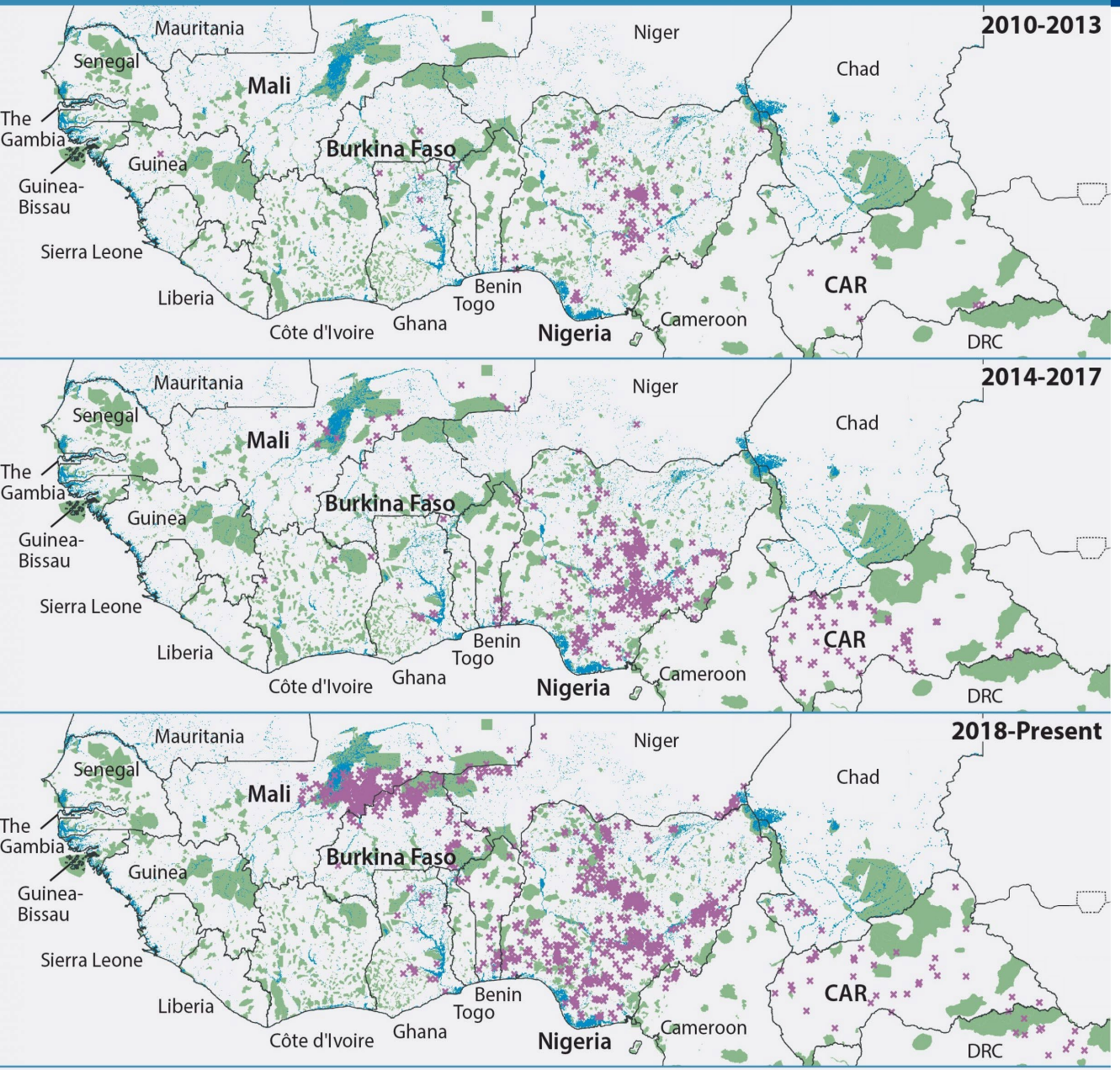

ARTETA
8
FABREGAS
4

AFRICA CENTER FOR STRATEGIC STUDIES

FARMER-HERDER CLASHES IN WEST AND CENTRAL AFRICA

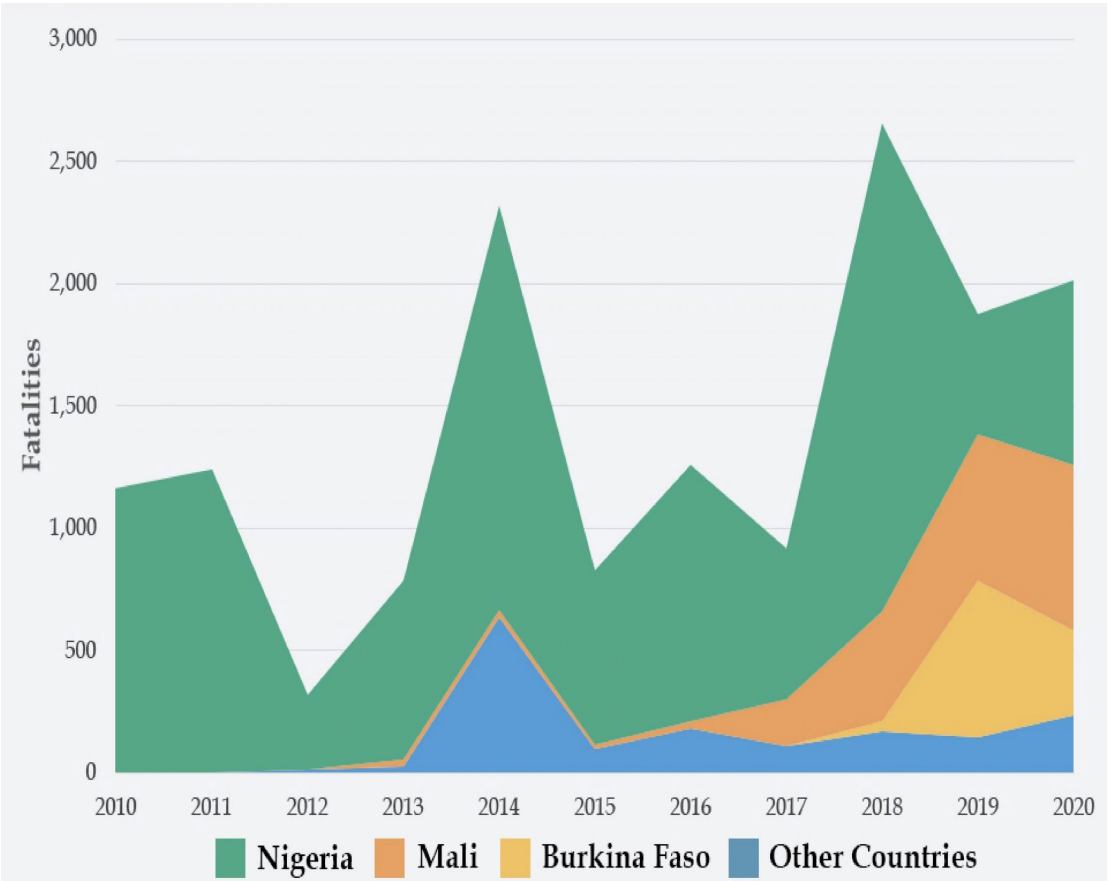
UF IFAS UNIVERSITY of FLORIDA

GLOBAL FOOD SYSTEMS INSTITUTE



Note: Maps exclude events attributed to violent extremist groups.

Data Source: Armed Conflict Location & Event Data Project



Note: Figures exclude events attributed to violent extremist groups.

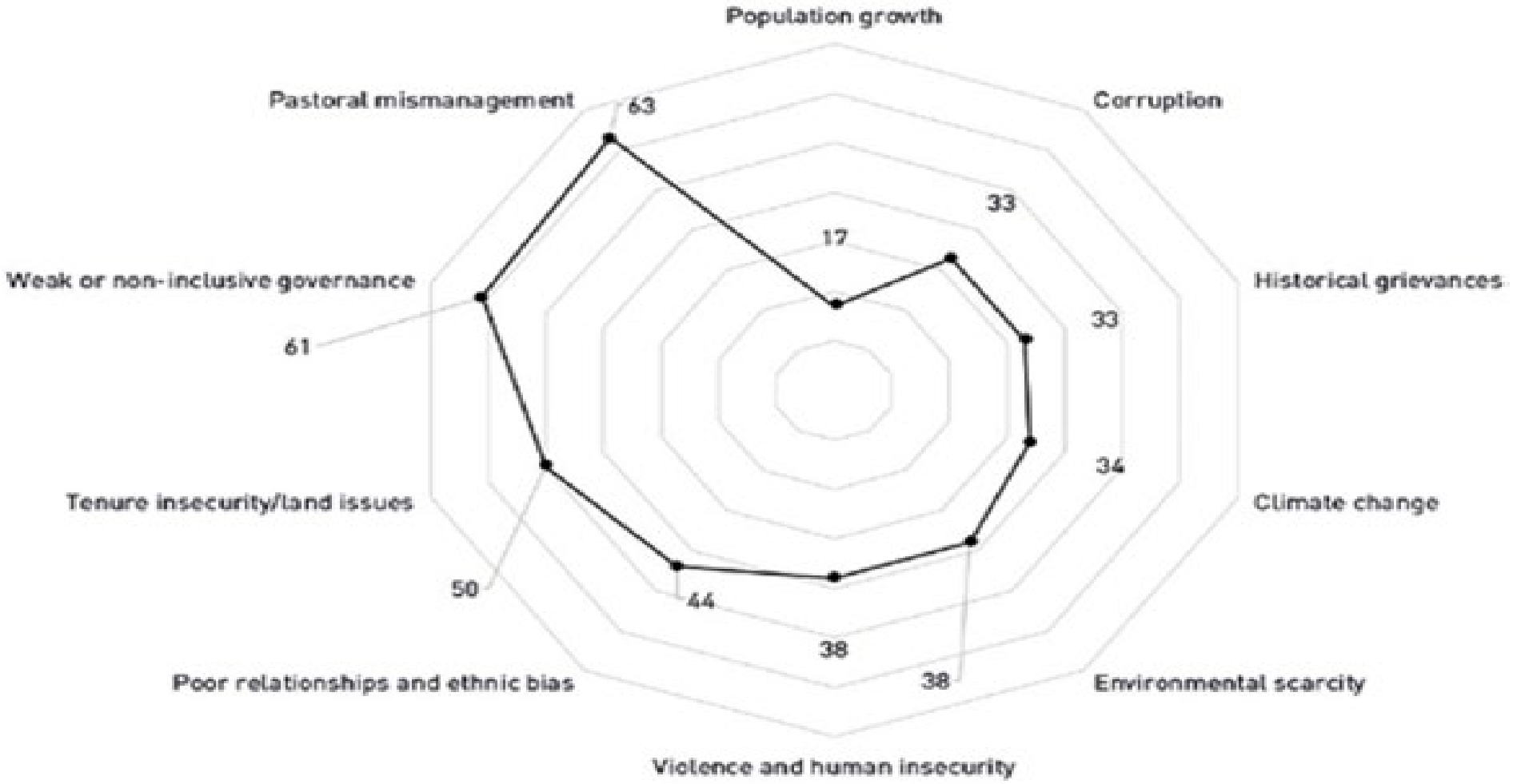
Data Source: Armed Conflict Location & Event Data Project

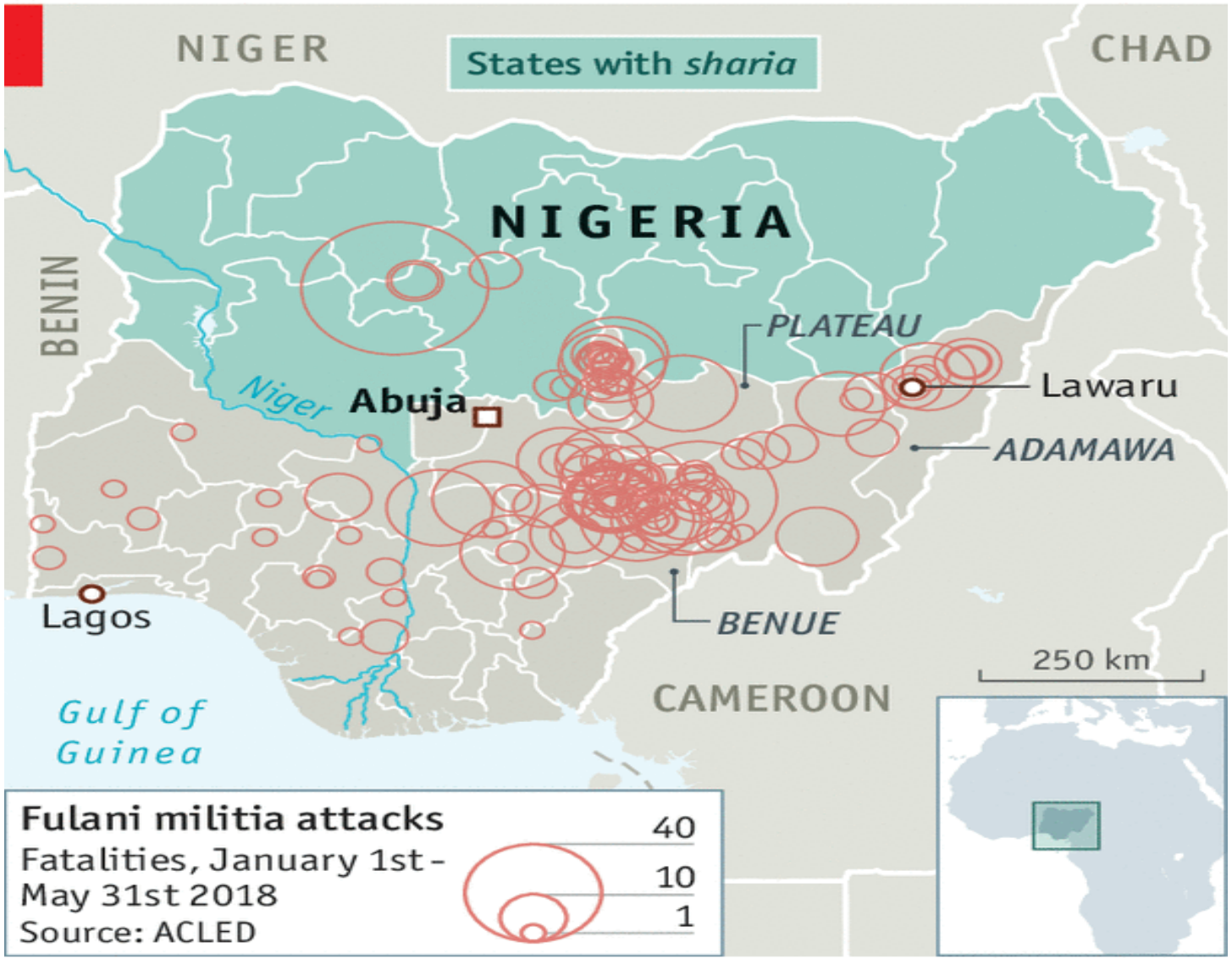

#SPEAKOUT4BENUE
END THE
BLOODSHED
BENUE LIVES
MATTER

Farmer-herder conflicts in Nigeria

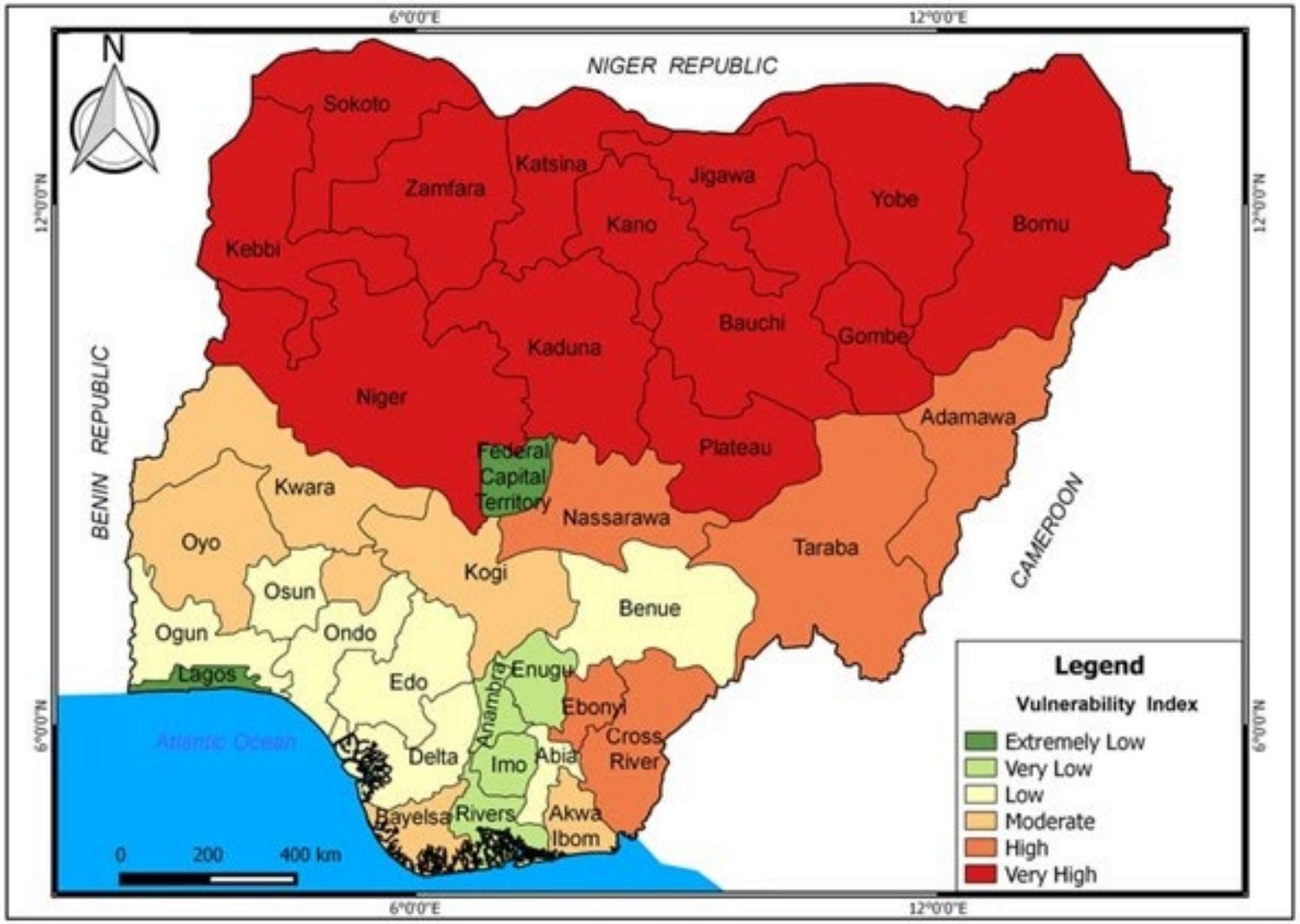
- Deaths are due to seasonal migration by nomadic pastoralists searching for feed and water
- Cattle encroach on crop farms, violence and deaths erupt.
- Worse in the dry season, when pasture is scarce and byproducts and concentrates are costly.
- Some states have banned pastoralists and created their own police force
- Populations and markets have been displaced, violence is rampant, and an ethnic group has been demonized

Causes of farmer-herder conflicts




NIGER
States with sharia
CHAD
NIGERIA
BENIN
PLATEAU
Niger
Abuja
Lawaru
ADAMAWA
Lagos
BENUE
250 km
CAMEROON
Gulf of Guinea
Fulani militia attacks
Fatalities, January 1st - May 31st 2018
Source: ACLED
40
10
1
Economist.com

Climate vulnerability in Nigeria



L&Z INTEGRATED FARMS

Mrs. Rakiya Damakka Abubakar

CO-FOUNDER/DIRECTOR

Co-Founder /Director L&Z Integrated Farms Nig. Ltd.

Muhammadu Damakka Abubakar

MD/CEO

Muhammadu Damakka Abubakar is the MD/CEO of L&Z.

Barr. Zubaida Damakka Abubakar (1978 – 2023)

CO-FOUNDER/DIRECTOR

A Lawyer and Executive Director Strategic Partnership...

Impacts of the L&Z Integrated Farms intervention

- Immediate and higher income for women
- Higher quality milk sold
- Empowered women
- Well-nourished kids and families
- Educated kids
- Pastoralists settled for three years – no farmer-herder conflicts

Go, get and cool the milk!

A potential solution to the farmer-herder conflicts

THE ALTERNATIVE, BETTER FEED:

An alternative for feeding livestock in the wet and dry season.

Higher in nutritional value than hay and crop residues.

Improved livelihoods and incomes in South Omo, Ethiopia (Gates Foundation funding).

Corn silage has improved livelihoods, beef production and rural incomes in Langzhou, China.

THE PROMISING SOLUTION:

Silage is rarely made by nomadic smallholder pastoralists due to lack of technical information, the prohibitive cost of equipment and silos, and seasonal migration of the herders.

This problem could be solved by private sector silage production at and or transportation to, strategic sites along pastoral routes for sale at affordable prices.
Alternatively, the silage can be made and or transported by silage cooperative unions involving semi-nomadic and sedentary pastoralists, who are trained, equipped and resourced.

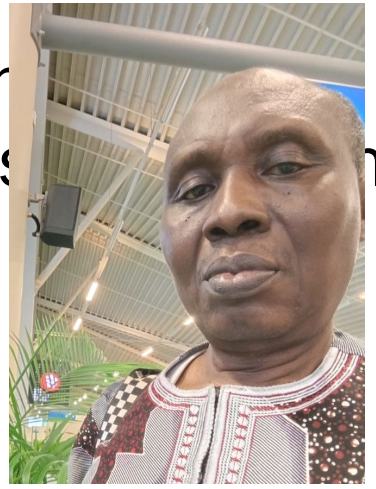
Life change 2

- There are no fences in your system
- Great to see an end to handouts
- We have money but it is mistargeted

The Dream Team








Ayoola Oduntan
National President, Feed Industry Practitioners Association of Nigeria (FIPAN)

GMD. Amo Group

Femi Edun
Co-founder Frontier Capital Limited
Finance & Investment prof essional

Ayo Bajomo
GM & Div Head, Corporate Finance and AdvisoryBank of Industry.

Bamikole Musibau Adungbe
Prof. of Ruminant Nutrition, University of Benin

Bode Olanrewaju
JKIA Ventures, CAPRO Ministries

Gbola Adesogan
Assoc. VP and Director, Global Food Systems Inst.,
Prof. of Ruminant Nutrition, Univ. of Florida

The Visionary Private Sector Partners

M.D. Abubakar
President Commercial Dairy Ranchers Association Of Nigeria (CODARAN)

Founder/CEO L&Z INTEGRATED FARMS

Ayoola Oduntan
National President,
Feed Industry Practitioners Association of Nigeria (FIPAN)
GMD. Amo Group

Tony Jibunoh
CEO Milkin Barn Limited

Ope Agbato,
E.D. Technical and Husbandry operations, Animal Care Services Konsult (Nig.) Ltd

The UF (Gator) Profs

Conclusions

- Global undernutrition has decreased in the last 20 years but stunting and wasting are still too high in Africa and Asia.
- More animal-sourced food consumption by the vulnerable is needed in Africa and Asia to improve nutrition, cognition, growth and livelihoods.
- More feeding of silage is critically needed in the Global South to improve livestock productivity, improve ASF consumption, reduce emissions intensity and improve livelihoods.
- Partnerships between med. to high-income countries and developing countries are needed to drive increases in silage production and feeding and improved food security in the Global south.