



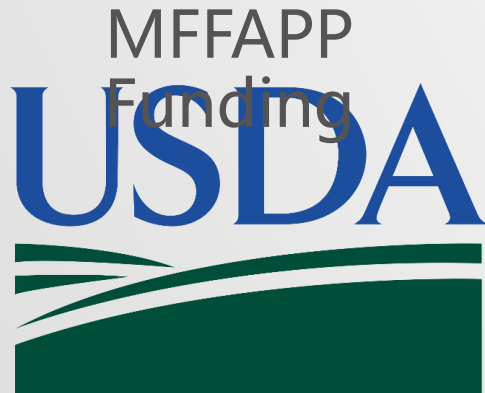
LATEST IN THE FIELD:

HIGHER DAIRY CONTENT RESULTS IN IMPROVED PHYSICAL OUTCOMES

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USADEC Boise, Idaho
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MFFAPP PARTNERSHIP:

Logistics, Implementation
& Local Research Team



Project Design,
Research, Analysis,
Training
& Quality Assurance



Ministries of
Education & Health
Institutional Review
Board

Village Elders &
CHW

Pre & Primary
School Directors,
Teachers, Parents,
PTAs &
PARTICIPANTS



Supplement
Producer & Supplier

GUINEA-BISSAU

- **A small country in West Africa**
- **11th poorest in the World**
- **Economy mainly cashew farming, fishing**
- **Foods grown for family consumption:**
 - **Rice (the staple food)**
 - **Millet**
 - **Cashews, groundnuts**
 - **Sweet potatoes**
 - **Mangos**
 - **Domestic animals (much less frequently)**
- **No local large scale research capacity**

FIRST LARGE SCALE NUTRITION RESEARCH IN 8,000+

3 RUSF effectiveness trials + 2 additional pilots

Nutrition Info from womb to adulthood

5,539

BOYS & GIRLS
(6-19 YR.)

529

PRESCHOOLERS
(24-59 MO.)

222

CHILDREN
(24-59 MO.)

459

INFANTS
(6-23 MO.)

807

MOTHERS
(PLW)

1,000

FAMILIES
(MOTHERS, FATHERS,
CHILDREN 6-59 MO.)



VILLAGE MOTHERS, INFANTS & CHILDREN

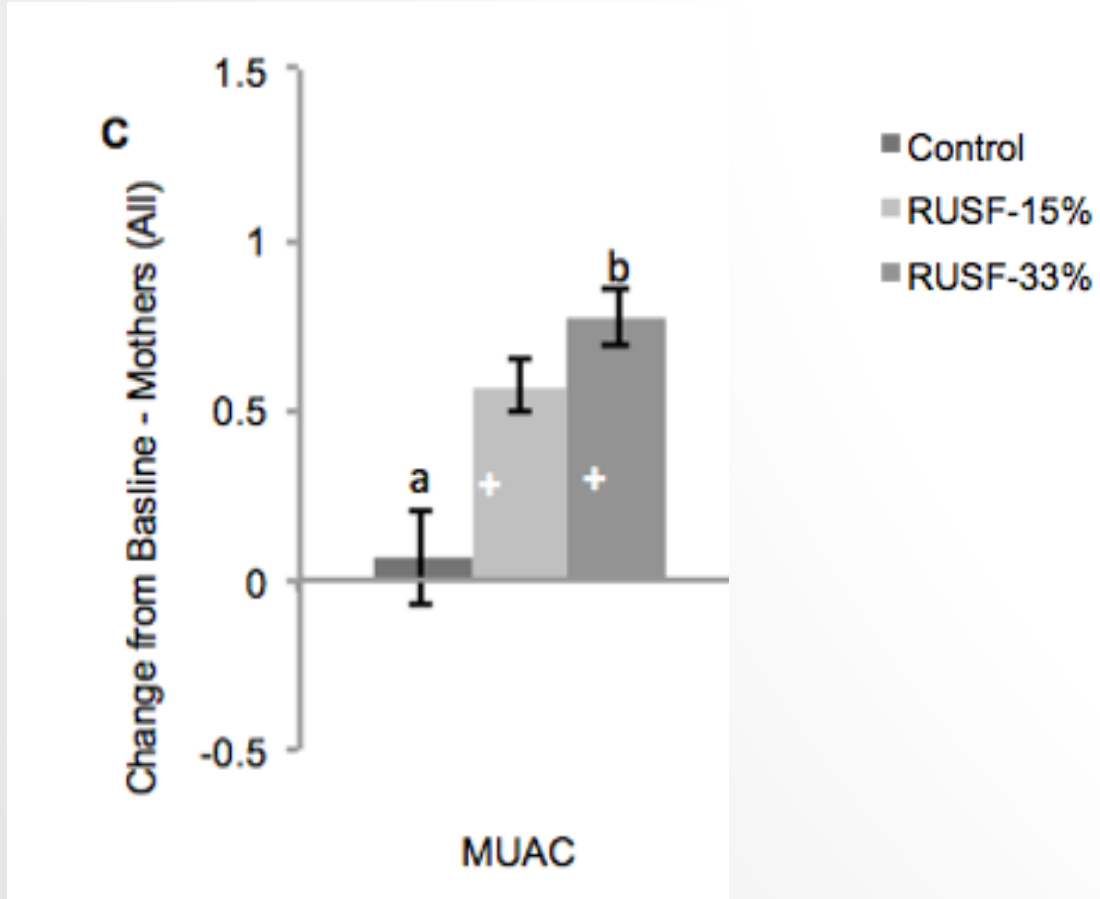


THE SUPPLEMENTS

- **WFP-style RUSF with either 15% or 33% of protein from dairy made by Challenge Dairy**
- **Vitamins and minerals to meet recommendations at the time of production (4-8 year olds)**
- **Highly palatable ready-to-use formulation**
- **Two identical products differing only in percent of protein provided by dairy (15% or 33%)**
- **Micronutrient profile met WFP guidelines at time of production (standard of care for MAM)**



CHANGES IN ANTHROPOMETRY & METABOLIC HEALTH OF VILLAGE MOTHERS



**Mothers randomized to receive RUSF-33%
had an increase in MUAC compared to controls (P= .03)**

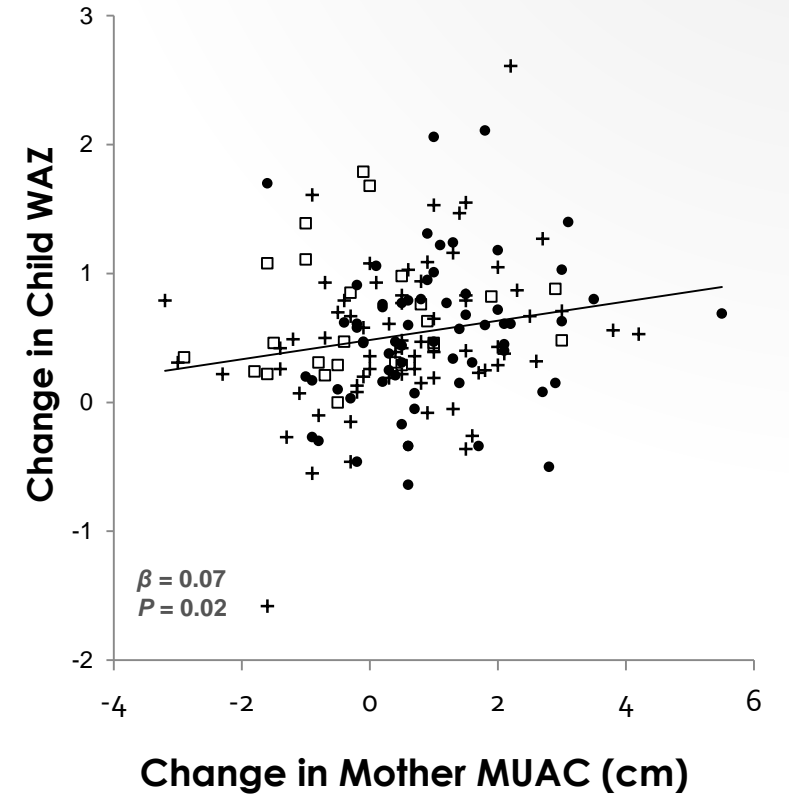
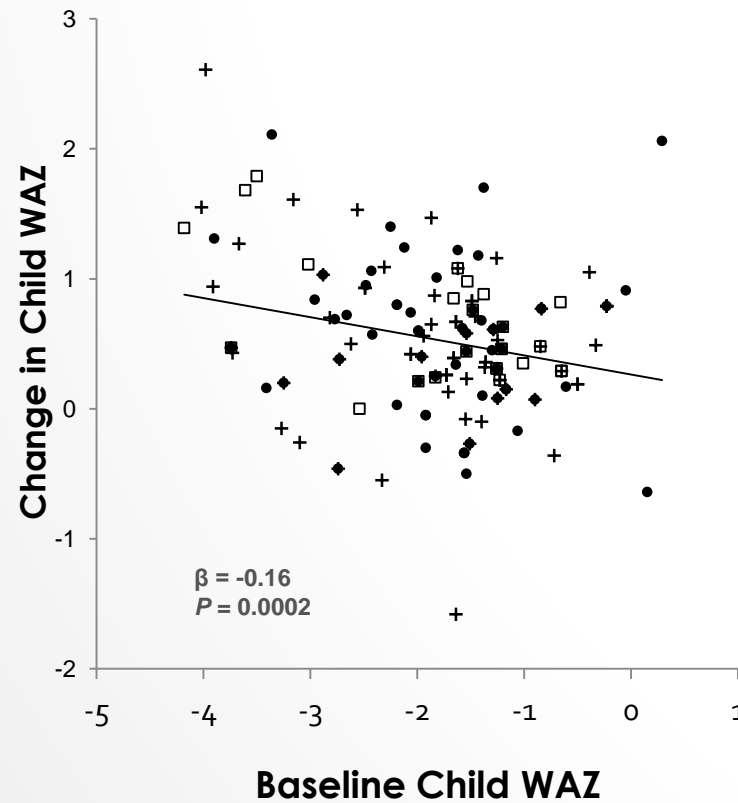
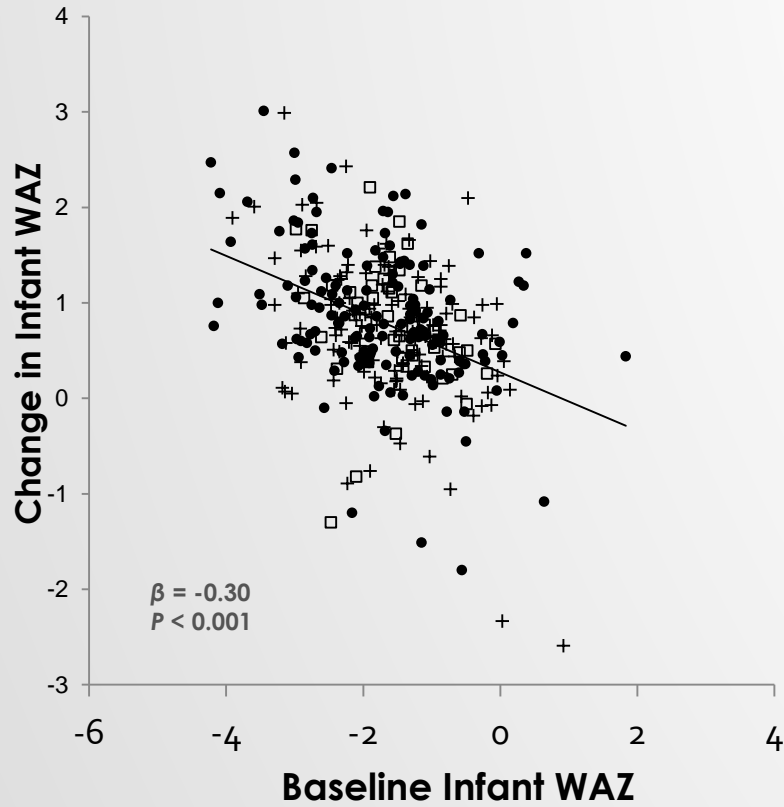




Measuring height, weight, mid-upper arm circumference of village mothers for baseline and endline results

Supplements with higher content of dairy protein improve nutritional status of mothers; a proxy for affecting children in the households and their dietary habits

RELATIONSHIP BETWEEN CHANGE IN INFANT, CHILD & MOTHER ANTHROPOMETRY DURING SUPPLEMENTATION



- Control
- + 15% RUSF
- 33% RUSF

VILLAGE RESULTS

- **Mothers:**
 - *Higher dairy supplements (RUSF-33%) improve nutritional status*
- **Infants/Toddlers & Children (6-59 months):**
 - **HAZ/WAZ increased substantially with both supplements**
- **Children (24-59 months):**
 - **Catch-up growth in all children given RUSF 15% and 33%**
 - **Only children who had low WAZ in control at baseline had some catch-up growth (traditional MAM remedy)**
 - *Additional benefit of RUSF-33% - significantly increased MUAC*
- **Infants/Toddlers (6-23 months):**
 - **Supplementation resulted in improved growth *unrelated to nutritional status of family***
- **Mother-Child Dyad: Response to supplements sheds light on family food dynamics**

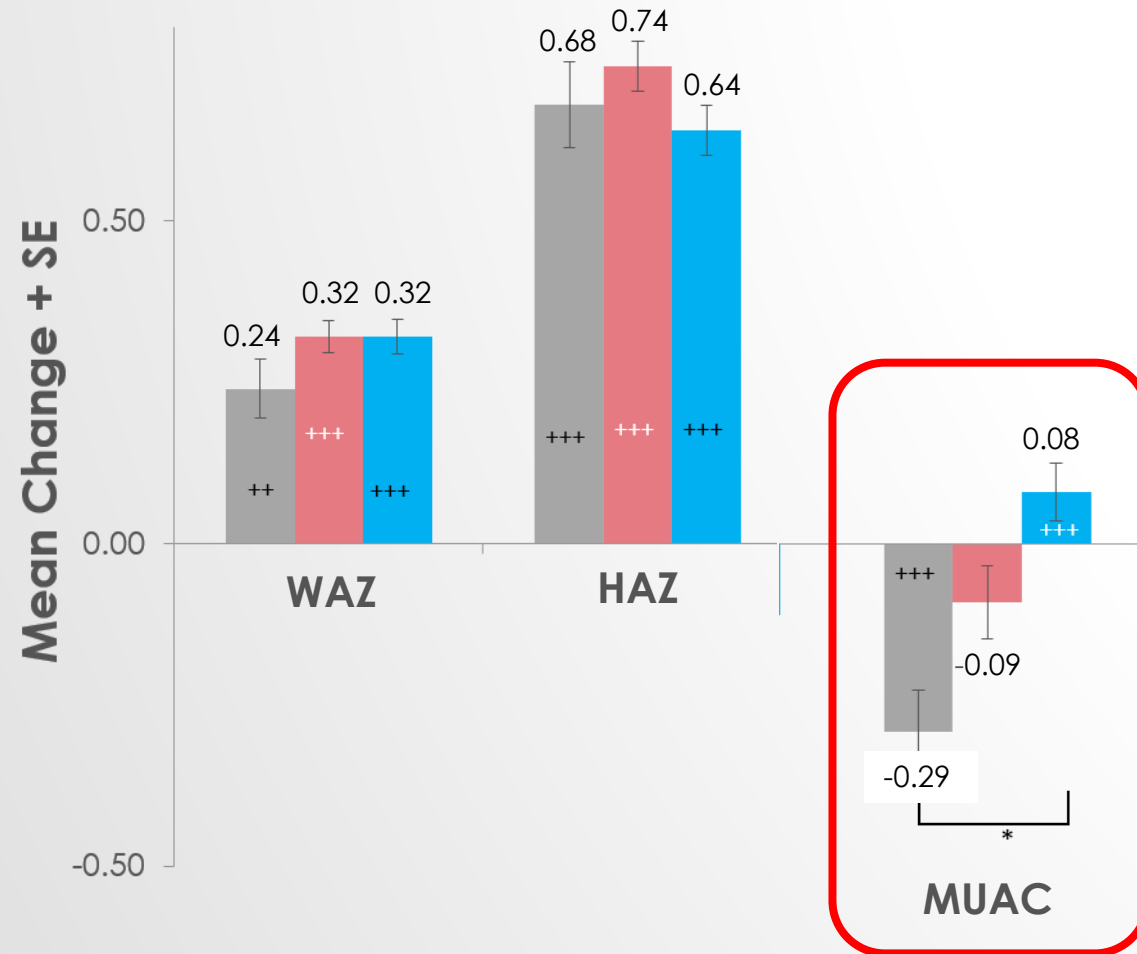
HIGHER DAIRY RUSF - SIGNIFICANT BENEFIT IN MOTHERS & CHILDREN (24-59 MONTHS)

SUCCESS IN OLDER CHILDREN ASSOCIATED WITH IMPROVED MATERNAL NUTRITION -- MORE DEPENDENT ON FAMILY DIET AND NUTRITION SITUATION --

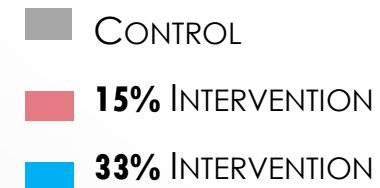


PRESCHOOL

Anthropometry of Preschoolers Pre/Post Δ



- **Second school meal helps all preschoolers broadly**
- **Additional MUAC benefit in RUSF with 33% protein from dairy**
 - *Significant decrease in control*



PRESCHOOL SUMMARY



- Children in preschools have low mean Z scores but not as low as those in primary school
- Both supplements had significant effect on increasing weight in preschool children who were not the most malnourished
- **33% supplement had additional benefit of increasing lean body mass (muscle)**

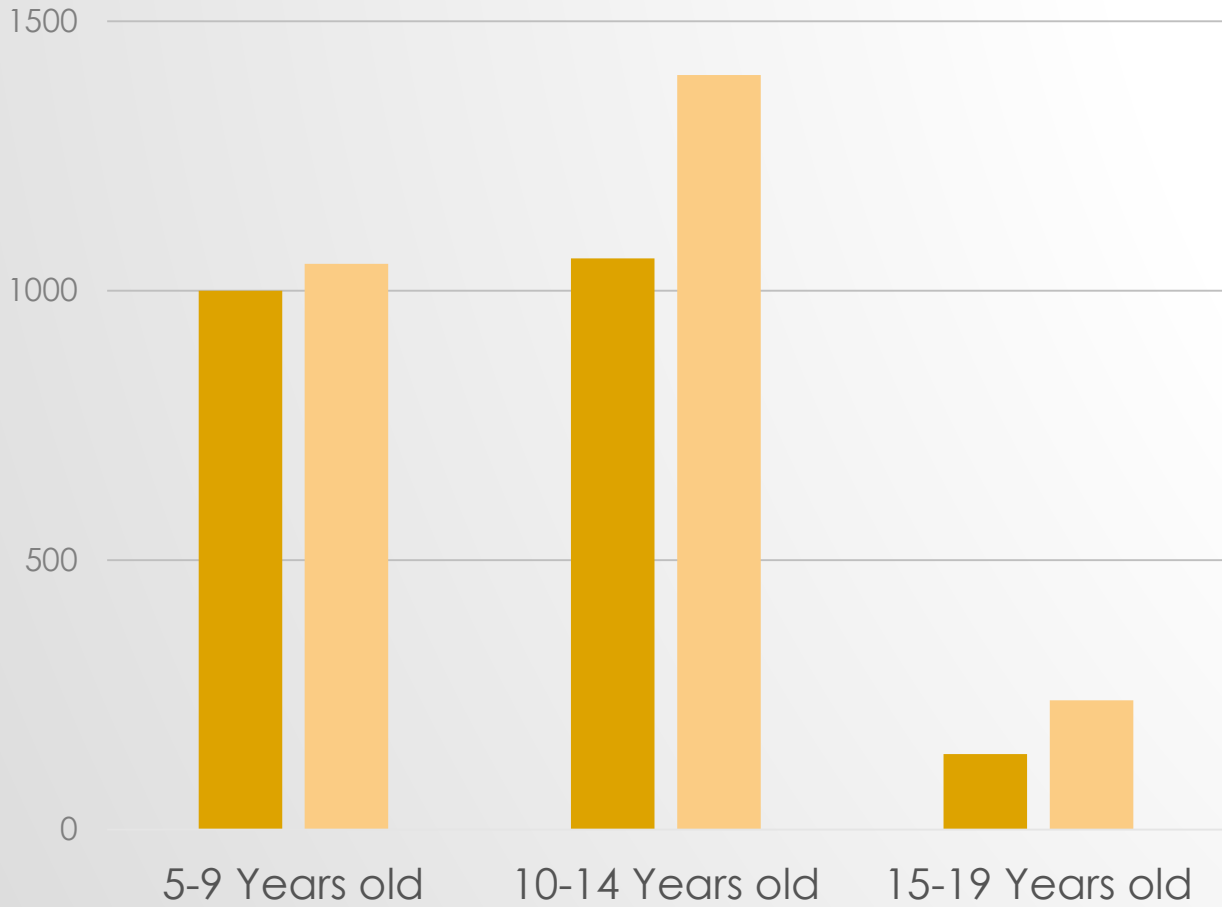




PRIMARY SCHOOL

BASELINE DEMOGRAPHICS

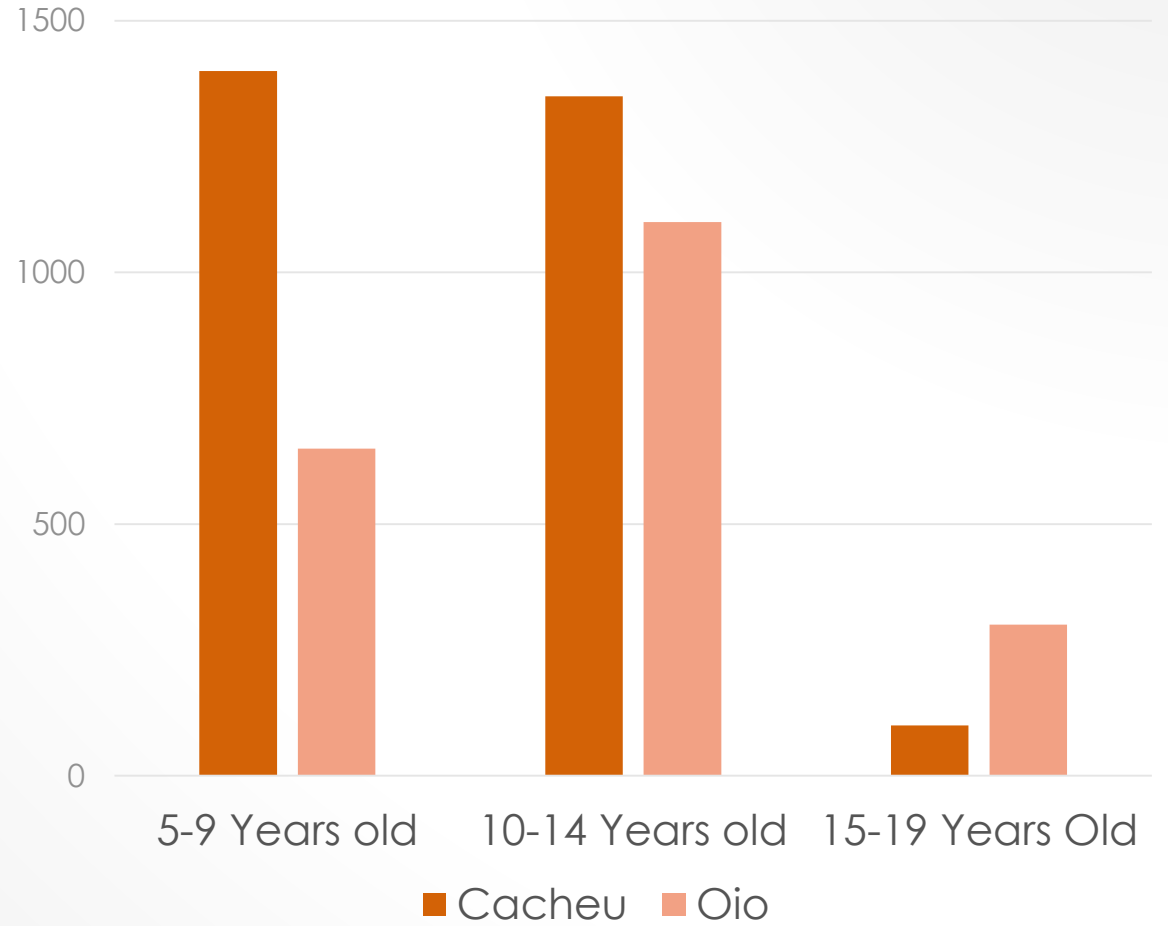
Numbers of Females and Males
Grouped by AnthroPlus Age Category



Saltzman et al.
Food Nutr Bull 2016

Female Male

Number of Study Participants from Study Regions
Grouped by AnthroPlus Age Category

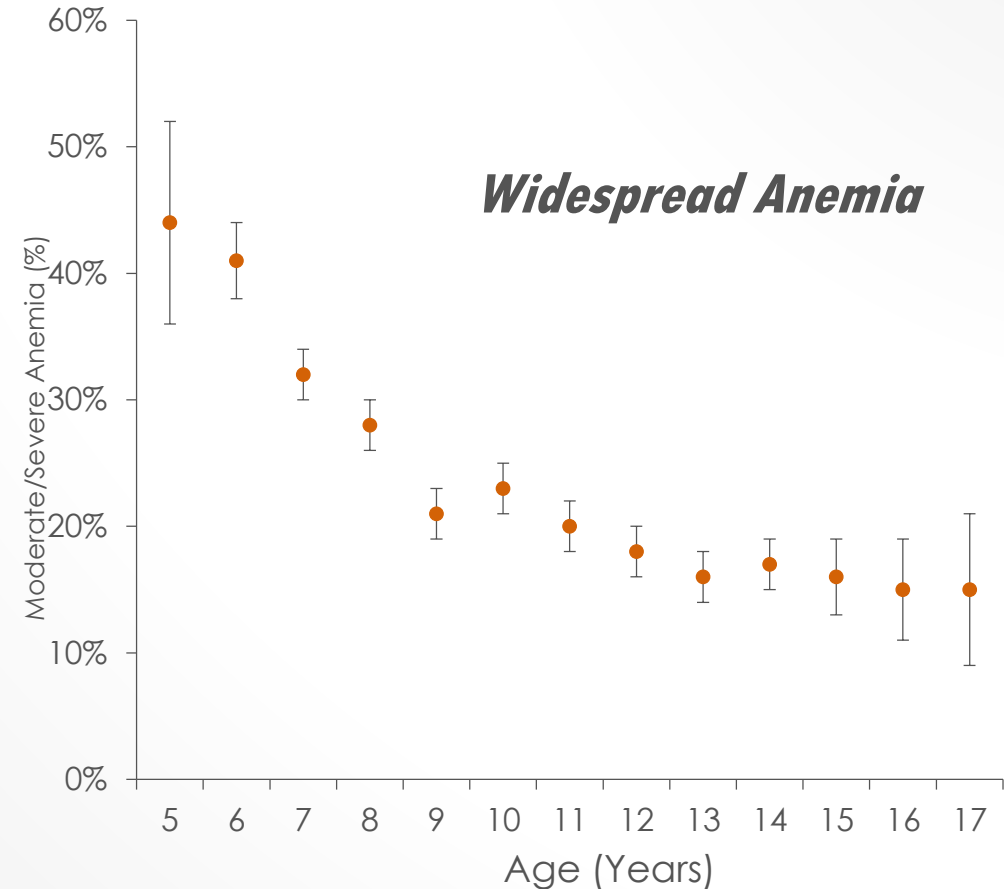
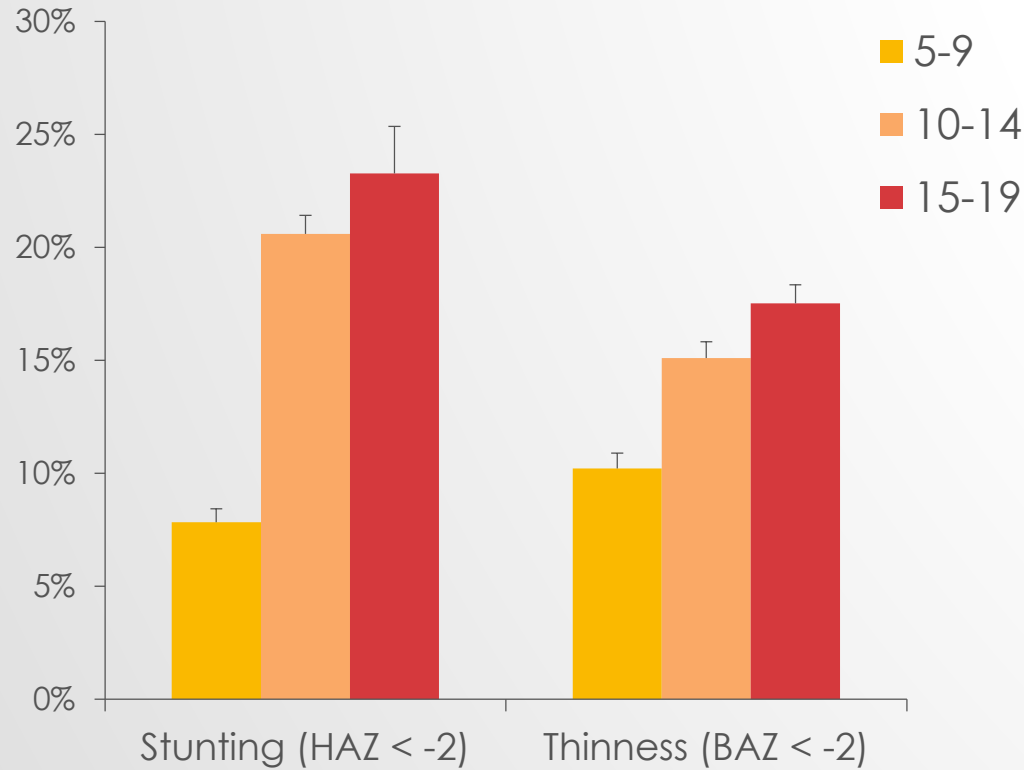


Cacheu Oio

GUINEA-BISSAU SCHOOL CHILDREN HAVE MULTIPLE PROBLEMS THAT IMPACT LEARNING

Including stunting, increasingly prevalent with increasing age

Widespread Undernutrition



Widespread Anemia

RESULTS

VILLAGE

- **Mothers:** Higher dairy RUSFs had significant benefit – gained lean body mass (MUAC)
- **Infants:** Both supplement levels increased Hb levels from baseline to 3 months, improved WAZ, HAZ
- **Children:** Both supplement levels increased Hb levels from baseline to 3 months

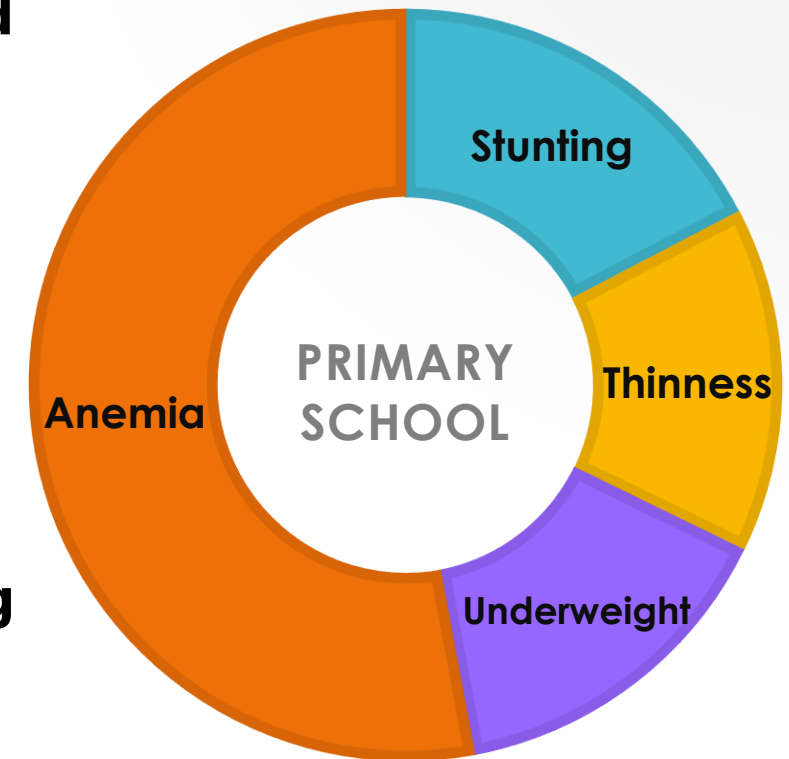
SCHOOLS

Preschool: 33% supplement had additional benefit of increasing MUAC

- **WHZ, MUAC** decreased in controls indicates worsening nutrition status not seen in supplemented children

Primary: Widespread malnutrition, anemia, wasting documented

CONSISTENT PATTERN EMERGING FROM MFFAPP STUDIES IN SEVERAL COUNTRIES



IMPORTANCE OF DAIRY PROTEIN IN DIET

- **Higher dairy protein RUSFs have potential to achieve broad benefits**
- **Higher levels of dairy can successfully prevent MAM in children <2 independent of family food dynamics**
- **Nutrition of children >2 is significantly tied to family food dynamics therefore making tailored nutrition education essential for this age group and their families**
- **The relationship of mother's nutritional status can be proxy for household food security**
 - **Understanding intra-household dynamics without having to do full on household food consumption study**

FOOD-BASED SOLUTIONS ARE CRITICAL OVER THE LONG-TERM



RECOMMENDATIONS

...PRODUCTS

DAIRY AND ANIMAL PROTEIN KEY AT CRITICAL TIMES OF DEVELOPMENT

- **Nutritional Products need to be optimized for long term health and wellness throughout life**
 - **Focus on protein quality and micronutrient density, appropriate to life stage**
- **Family of products with 33% or more dairy protein for first 1,000 days and beyond (RUTF with 50% dairy for SAM)**
 - **INFANTS (6-23 mo.) – breast milk, complementary foods (Fortified Blended Foods), RUSF as needed CHILDREN (24-59 mo.) – RUSF, higher dairy/animal protein important, household dietary diversity, density – improved preschool meals/supplements with nutrients for cognitive/brain, physical development**
 - **YOUTH (5-19 years) – specialized RUSF household dietary diversity, focus on fruits and vegetables, micronutrients/iron supplementation, improved school meal**
 - **WOMEN (of reproductive age, PLW) – specialized RUSF, higher dairy protein, supplemented with MAM children, focus on micronutrients/iron and folate (more savory options for adults)**

RECOMMENDATIONS

...PROGRAMS & PEOPLE

NEXT GENERATION OF PRODUCTS TO INTEGRATE WITH LOCAL FOOD SYSTEMS

- **Farm and Pharma – next generation of products must be integrated with local food-based solutions and behavior change**
 - **Consumer-based approaches; nutrition sensitive solutions; ag and health systems**
- **Stimulate Local Economy: Products made locally with native ingredients to fit into local tastes and food preferences**
 - **Dairy ingredients needed in first stage - Role for US Dairy industry**
- **Make Use of Many Platforms: Incorporate approaches into NGO/community/PTA/school platforms**
 - **Ensure local and national ownership; engage stakeholders to focus on first 1,000 days and beyond**
 - **Focus on early child development - reaching preschoolers with more robust supplements, second meals at ECD/daycare/preschools**
 - **higher protein from dairy (macronutrients: protein, energy, fat)**
 - **Focus on micronutrients in primary schools – iron, other measures to fight anemia**

Prevention & Intervention

**IRON, OTHER MICRONUTRIENTS
CRITICAL**



**DAIRY CRITICAL
FOR
FIRST 1,000
DAYS**



**IMPROVED HOUSEHOLD DIET
QUALITY, NUTRITION**



MOTHERS

**INFANTS
UNDER 2 YEARS**

**CHILDREN
2-5 YEARS**

**OPTIMAL
HEALTH & WELLNESS
STUNTING & WASTING
PREVENTED**

**YOUTH
6-19 YEARS**

HOME, MCH, HEALTH
CENTERS

HOME, MCH, PRESCHOOLS,
COMMUNITIES

SCHOOLS, PTAs,
COMMUNITIES

THIS IS WHAT WE STRIVE FOR



THANK YOU

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**Special thanks to the families who participated in this work,
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