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Thank you for your cooperation.
Dairy as an Engine of Economic Growth
Dairy for Global Nutrition

• An initiative of the US Dairy Export Council
• We focus on funding research and projects to advance the science on the management of malnutrition, with a focus on stunting prevention
• Our work: support collaborative trials, communications, technical/R&D and supply chain
Dairy for Global Nutrition supports the International Code of Marketing of Breast-Milk Substitutes and other global nutritional principles set forth by the World Health Organization, the Codex Alimentarius, and UNICEF.

Breastmilk is the best source of nutrition for infants under 6 months. It is recommended that breastfeeding is continued along with appropriate complementary foods up to 2 years of age or beyond.
Major Pillars of Economic Development

- Reduced Morbidity
- Physical Growth
- Cognitive Development
- Reduced Chronic Diseases
Stunting and Economic Growth

All pillars of economic development affected

- Reduced Morbidity
- Physical Growth
- Cognitive Development
- Reduced Chronic Diseases

Child stunting negatively affects all these factors
Nutrition-specific Interventions: Direct Impact

In addition to nutrition-sensitive programs...

Reduced Morbidity  
Physical Growth  
Stimulate Cognitive Development  
Reduced Chronic Diseases

Nutrition-specific approaches can make a difference
Dairy, Stunting Prevention and Economic Growth

What role do dairy nutrients play?
Stunting: A Life Cycle Approach

- First 1,000 Days
- Early-mid Childhood
- Adolescence
- Adult-hood
- Golden Years

Photo courtesy: Pbs.org
Physical Growth Impairment’s Consequences

- Low birth weight
- Growth failure

First 1,000 Days

Early-mid Childhood

Reduced Stature: 6-7 cm for women, 9 cm for men

Golden Years

Adolescence

First 1,000 Days

Early-mid Childhood
Stunting: Cost to individuals

- Low birth weight
- Growth failure

First 1,000 Days

Golden Years

Early-mid Childhood

Assessment

Reduced Stature: 6-7 cm for women, 9 cm for men

1% increase in height = 2.4% increase in adult male earnings
Cognitive Growth’s Consequences

- **First 1,000 Days**: Poor scores, attention, fluency, memory
- **Reduced grade attainment**: Cognitive Impairment
- **Golden Years**: 
  - Early-mid Childhood
  - Adolescence
  - Adult-hood

Cognitive Growth’s Consequences

- **Cognitive Impairment**: Poor scores, attention, fluency, memory
- **Golden Years**: 
  - Early-mid Childhood
  - Adolescence
  - Adult-hood

Reduced grade attainment
Stunting: Cost to Individuals

- Cognitive Impairment
  - First 1,000 Days
  - Poor scores, attention, fluency, memory

- Reduced grade attainment

- Golden Years

- Each additional grade of schooling: +9% wages
Stunting: Long-term Impacts

- Early-mid Childhood
- Overweight
- Adult
  - Obesity
  - Diabetes
  - Hypertension
- Golden Years
- Sarcopenia
- First 1,000 Days
- Low lean body mass
- Poor body composition

Stunting begins in the First 1,000 Days, leading to poor body composition and low lean body mass. This can result in conditions like obesity, diabetes, and hypertension in adulthood. Poor nutrition in early life also affects health in later stages.
Long-term costs of stunting

- Low lean body mass
- Poor body composition
- Sarcopenia
- Lost of employment
- Cost of care (vary between countries – est. 20% of economic benefit)
Investments in Stunting Reduction: High Returns

Every $ invested in reduction of stunting generates ~$18 in economic returns

Hoddinot. J. et al. 2013
In East Asia: Benefit Cost Ratios Even Higher

Vietnam 1: $35.5
Philippines 1: $43.9
Indonesia 1: $47.9
Burma 1: $17.7
Bangladesh 1: $18.4

Source: FantaProject.org
How Do Dairy Nutrients Impact Economic Growth in Emerging Economies?

- Moderate malnutrition recovery
- Linear growth and related cognitive development
- Reduction of stunting in-utero
- Catch-up growth
- Improvement of lean body mass
- Reduction of obesity risk
- Reduction of chronic diseases risk later in life
Dairy and the First 1,000 Days

First 1,000 Days

Early-mid Childhood

Adolescence

Golden Years

Adulthood

Photo courtesy: Pbs.org
Recent Studies: Dairy Effective for MAM, Growth

• Dairy ingredients recognized as superior to plant proteins, even at lower inclusion rates:
  ✓ “There is a consistent benefit of FBF that include dairy in treatment of children with MAM” (Suri et al. 2016)
  ✓ Dairy vs. soy: Higher recovery rates and improved growth (Stobaugh et al. 2016)
  ✓ “Superior performance of dairy protein in the treatment of acute malnutrition” (Batra et al. 2016)
Protein Quality and Growth

- Effect of using proteins of different quality on recovery
- DIAAS Food Aid Score associated with recovery

“When looking at all the protein quality scores, dairy protein is likely to be higher, and particularly for malnourished children, dairy proteins are associated with higher growth”

(Manary et al. 2016, Review of 6 clinical trials)
Current USDA Standards (December 2015)

- Therapeutic foods: 50% of protein from dairy
- Supplementary foods: 33% of protein from dairy

Source:
Pregnant Mothers and Malnutrition

- Positive association between maternal dairy intake and birth weight
  
  - >3 glasses per day = larger head circumference, femur length

- Supplementation of mothers: micronutrients alone not sufficient
  
  - Small doses with dairy = 25-31% reduction in stunting, small head size

(Mridha et al. 2016)
Stunting: Long-term Impacts

- Low lean body mass
- Poor body composition
- Early-mid Childhood
  - Obesity
  - Diabetes
  - Hypertension
- Golden Years
  - Sarcopenia
- At 1,000 Days
  - Overweight
- Adult:
  - Obesity
  - Diabetes
  - Hypertension
Managing Double Burden of Malnutrition

• Legitimate concern about long-term impact of supplements provided to manage malnutrition

• Treatment is usually only a few weeks long, but broader use (adolescent mothers, catch-up growth/school meals) could become more common
Dairy dietary pattern is positively associated with changes in length for age scores

“Introduction of animal source foods such as dairy is important...high quality protein, bioactive components essential for growth”

☑ Important to introduce dairy products as part of complementary foods to optimize linear growth

Dairy is Associated with Lean Body Mass

- Reports of lean body mass increases in a number of studies with children receiving milk (Kulkarni et al. 2014)

- Substantial evidence that higher intake of milk is positively associated with lean body mass in infancy, childhood and adolescence in low income countries (Kulkarni et al. 2014, Hoppe et al. 2006, Allen 2011)
Dairy Reduces Obesity Risk

Long-term association between dairy consumption and reduced risk of child obesity

- Meta analysis (>46,000 children): children in highest dairy intake group 38% less likely to be obese
- Risk of childhood obesity 13% lower with each serving per dairy increment dairy intake
- Effect is through lean body mass increases/fat mass decrease
- Key: dairy proteins (leucine) + minerals

(Lu et al. 2016. Developed countries)
Pregnant Mothers and Overnutrition

• Higher maternal protein intake at the expense of carbohydrate or fat intake at 26–28 wk gestation associated with lower abdominal internal adiposity in neonates.

(Chen et al. 2016, Singapore)
Meta-analyses and systematic reviews support a negative relationship between the consumption of dairy products and the risk of the metabolic syndrome and Type 2 diabetes (Chen et al. 2015).
Prevention of Obesity; Role of Whey

- Study in China: 200 ml of milk/day + 1 egg to decrease malnutrition
- Boys’ lean body mass increased and no difference in obesity/overweight group vs. control (no supplement)

(Lin et al. 2015)

- Dairy proteins, in particular BCAAs in whey, play a key role
- “Dairy proteins have a high potential of improve metabolic disturbances due to their amino-acid composition”

(Bjornshave et al. 2014)
Dairy and Economic Growth: Emerging Science

- Reduced Morbidity
- Physical Growth
- Stimulate Cognitive Development
- Reduced Chronic Diseases

Microbiome
Role of other dairy nutrients
In Summary

• Each $ invested in malnutrition yields high economic returns

• Dairy nutrients are now proven to help manage undernutrition, prevent stunting

• The “extra cost” of dairy is small: less than $1.36 per child who recovers from malnutrition, $0.0017/ration

• Dairy nutrients can also provide life-long protection from chronic diseases in developing countries
Thank you

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Full references and sources available upon request