From malnutrition to nutrition security

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“Nurturing development: Improving human nutrition with animal-source foods”
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From malnutrition to nutrition security

• Definition of food and nutrition security
• Prevalence of Malnutrition in all its forms
• Prevalence and Causes of Stunting
• Economic growth and malnutrition
• Anthropometry in the Netherlands and US in the past 70 years
• Sustainable approaches of production of nutrient dense food in Africa
Food Security and Nutrition Security

• “Food and nutrition security exists when all people at all times have physical, social and economic access to food, which is consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life.”
The scale of malnutrition in 2016

Out of a world population of 7 billion
- About 2 billion people suffer from micronutrient malnutrition
- Nearly 2 billion people suffer from calorie deficiency
- 667 million children under age 5 worldwide
- 159 million under age 5 are too short for their age (stunted)
- 50 million do not weigh enough for their height (wasted)
- 11 million are overweight

Out of 5 billion adults worldwide
- Nearly 2 billion are overweight or obese
- One in 7 has type 2 diabetes

Out of 129 countries with data, 57 countries have serious levels of both undernutrition and adult overweight (including obesity)

Sources: Micronutrient malnutrition: WHO (2009); overweight and obesity: WHO (2016); child stunting, wasting, and overweight: UNICEF, WHO, and World Bank (2015); calorie deficiency: FAO (2016); diabetes: WHO (2016). Multiple burdens: The cutoffs for placing countries in each indicator category are as follows: under-age 5 stunting ≥ 20 percent, wasting ≥ 3.5 percent, women of reproductive age anemia ≥ 20 percent, and adult overweight and obesity (BMI > 25) ≥ 35 percent. Full results appear in Appendix Table A.1.
24% of the world’s 667 million children are stunted
What does a child need to grow optimal?
A child grows through an adequate intake of nutrients (proteins, fat, KH, vitamins and minerals)
A child grows through an adequate intake of nutrients (proteins, fat, Carbs, vitamins and minerals)

- **Breastfeeding**
  - 0-6 months exclusive
  - 7-11 months
  - 12-23 months

- **Formula**
  - In case of child can not be breastfed:
    - Optimal nutrients but expensive
    - No anti-infection properties
    - Long-term health is better in breastfed children
    - Preparation needs clean water

- **Complementary foods**
  - Animal source proteins and micronutrients (milk)
  - Fortification with other essential nutrients
  - Theoretically possible to make by parents but very difficult
Exposure to an unhealthy environment and diseases diminishes the effectiveness of food intake

- Clean environment
  - Housing
  - Dirty playgrounds
  - No access to water and sanitation

- Medical
  - Access to health services
  - Vaccinations
  - Treatment of diseases
  - Optimal microbiota
Environmental Enteric Dysfunction (EED)

• Environmental enteric dysfunction (EED) is a disorder of the small intestine, which begins early in infancy particularly among poor people living close to animals.

• Gut structure loses its absorptive capacity, and its small intestine’s function is impaired.
A child grows through an adequate intake of nutrients (proteins, fat, KH, vitamins and minerals) Lancet 2013
Improvements in the economy usually have a marked effect on nutritional outcomes
Association of Household Rice Expenditure with Child Nutritional Status Indicates a Role for Macroeconomic Food Policy in Combating Malnutrition

Harriet Torlesse, Lynnda Kiess, and Martin W. Bloem

ABSTRACT Macroeconomic food policies have the potential to reduce malnutrition by improving access to food, a determinant of nutritional status. However, very little is understood about the mechanisms and the magnitude of the effects of macroeconomic food policies such as food price policies on nutritional status. Data collected by the Nutritional Surveillance Project on a total of 81,337 children aged 6–59 mo in rural Bangladesh between 1992 and 2000 were used to examine how changes in rice price affect child underweight. Rice consumption per capita declined only slightly during the period but rice expenditure per capita varied widely due to fluctuations in rice price. Rice expenditure was positively correlated with the percentage of overweight children ($r = 0.91$, $P = 0.001$). Households were found to spend more on nonrice foods as their rice expenditure declined, and nonrice expenditure per capita was negatively correlated with the percentage of overweight children ($r = -0.91$, $P = 0.001$). The findings suggest that the percentage of overweight children declined when rice expenditure fell because households were able to spend more on nonrice foods and thereby increase the quantity and quality of their diet. We hypothesize that macroeconomic food policies that keep the price of food staples low can contribute toward reducing child underweight. J. Nutr. 133: 1320–1325, 2003.
Rice Expenditure and Underweight 1992-2000

![Graph showing rice expenditure and underweight children from 1992 to 2000]
Rice Consumption and The Price of Rice 1992-2000
Increases in households’ purchasing power have a direct impact on nutrition.
Non-Staple food expenditure and Undernutrition 1992-2000
Dutch population has grown in the last 50 years to become the world’s tallest population.

Back in 1935, the Dutch population was shorter than the American population. However, in the last 50 years, the Dutch population has grown, whereas the American population has seen a deterioration in nutritional outcomes.

### Table: Comparison between Dutch and American Population

<table>
<thead>
<tr>
<th></th>
<th>Dutch</th>
<th>American</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average caloric intake (Kcal)</td>
<td>3,240</td>
<td>3,770</td>
<td>+16%</td>
</tr>
<tr>
<td>Body Index mass (% of pop. normal)</td>
<td>25.2 (67%)</td>
<td>29 (42%)</td>
<td>+15%</td>
</tr>
<tr>
<td>Waist measurement (cm)</td>
<td>91</td>
<td>94.5</td>
<td>+8%</td>
</tr>
<tr>
<td>Time watching TV (hours per day)</td>
<td>3.3</td>
<td>4.9</td>
<td>+50%</td>
</tr>
<tr>
<td>Life expectancy (years)</td>
<td>80</td>
<td>76</td>
<td>+5%</td>
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### Points for reflection

- Despite both countries having booming food industries, the Dutch population has grown in the last 50 years, whereas Americans have seen their nutritional outcomes deteriorate.
- Even though the American diet is unhealthy and induces very high overweight rates, the impact is not fully seen on life expectancy.
- Impact on the health care system has been drastic (e.g., increased diabetes, heart disease, etc.).
Science or Ideology?
Macrobiotic nutrition and child health

Study Population

- **Macrobiotic children**
  - White
  - Birth weight ≥ 2500 g
  - No congenital disease

- **Omnivorous control children (included in longitudinal cohort study):**
  - Frequency-matched with the macrobiotic group for month of birth, sex, parity, education of the parents, and region of residence

- **Mothers:**
  - On macrobiotic diet for ≥ 3 years at baseline
  - 92% attended special courses/consultations on macrobiotic child nutrition.
  - The educational level was high: 64% of the fathers and 45% of the mothers had completed college or university degrees, as compared with 17% for men and 9% of controls
Cross-sectional curves of height (cm) of macrobiotic infants (c=boys, d=girls)

Height (cm) was below reference data from Dutch children, growth was retarded mainly between 6 and 18 months.
Difference in psychomotor development of macrobiotic infants compared to control infants

<table>
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<tr>
<th>Gross motor development</th>
<th>$\bar{x}$</th>
<th>$p^2$</th>
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<tbody>
<tr>
<td>Sitting and head balance</td>
<td>-0.48$^*$</td>
<td>0.04</td>
</tr>
<tr>
<td>Locomotion</td>
<td>-0.60</td>
<td>0.001</td>
</tr>
<tr>
<td>Overall</td>
<td>-0.63</td>
<td>$&lt;0.001$</td>
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<tr>
<td>Fine motor development, adaptation</td>
<td>-0.13</td>
<td>0.49</td>
</tr>
<tr>
<td>Speech and language development</td>
<td>-0.42</td>
<td>0.03</td>
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</table>

$^1$Adapted from reference 31.

$^2$Student's $t$ test.

$^*$Negative values indicate slower development in the macrobiotic group.

Gross motor development and speech and language development were significantly slower in the macrobiotic group.
The rise and fall of protein malnutrition in Global Health

Richard D. Semba
Wilmer Eye Institute, Johns Hopkins University School of Medicine, Baltimore, MD, USA
WFP has an important role to play in overcoming global bottlenecks to improved MNCH outcomes with partners

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<th>Nutrition interventions</th>
<th>Global bottlenecks</th>
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<td>• Partnership with UNICEF, UNFPA – <em>adolescent girls and pregnant women</em></td>
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<td>Difficulty of reaching most at-risk girls (e.g., married, not in school) with nutrition and SRH education</td>
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<td>• Nutrition for MNCH in emergencies – PLW, children 6-23 mo</td>
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<td>• Food support in last trimester and first six months of lactation</td>
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<td>• Increasing access to safe, high quality, nutritious complementary foods to fill the ‘nutrient gap’ for young children</td>
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<td><strong>Children 6-23 mo</strong></td>
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<td>• Governments are reluctant to import good quality comp. foods</td>
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<td>• Treatment of MAM</td>
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<td>• Prevention of undernutrition and stunting</td>
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| **Pregnant and lactating women** | • Meeting micro nutrient requirements  
                                • Food support in last trimester and first six months of lactation | • Programming gap in providing food support to PLWs in food insecure areas |
| **Children 6-23 mo**    | • Treatment of MAM  
                          • Prevention of undernutrition and stunting | • **Lack of access to** safe, high quality, nutritious **complementary foods** to fill the ‘nutrient gap’ for young children  
                           • **Governments are reluctant** to import good quality comp. foods |

**WFP’s contribution**

- Partnership with UNICEF, UNFPA – adolescent girls and pregnant women
- Nutrition for MNCH in emergencies – PLW, children 6-23 mo
- Increasing access to complementary foods – children 6-23 mo
  *(partnership with CHAI)*
SC+, more appropriate from a nutritional perspective, is not being widely used due to several bottlenecks

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<th>Supply side barriers</th>
<th>Demand side barriers</th>
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<td>Quality &amp; safety of local products</td>
<td>Knowledge of nutrient needs</td>
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| • Locally produced nutritious foods are often of an *inferior quality in terms of nutrient content*  
  • Products can be non adherent to *international safety standards* | • Lack of knowledge about what constitutes a healthy nutritious diet for children 6-23 months  
  o Nutrient needs of infant and young children require a *diverse diet*: breast milk, plant & animal source foods and fortified foods |
| Affordability | • Using natural foods to meet the nutrient requirements can be *expensive* (buy different fresh foods, avoid spoilage, prepare few times a day)  
  • *Top-end imported* complementary foods are costly |
| Perceived Sustainability | • *High quality products are imported* from Europe (Italy and Belgium) and USA  
  • *Governments are hesitant to import SC+* since it is not a sustainable solution for them (in contrast with ARVs?!) |
Sustainable, market-based solution to undernutrition in East Africa

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<th>Local production of SC+ entails:</th>
<th>Local production of SC+ will prevent undernutrition and support local economies</th>
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<td>• Development of a nutritious product for young children that can be produced locally in Eastern Africa (SC+)</td>
<td>• WFP will procure SC+ to support national nutrition programming</td>
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<tr>
<td>• Engagement with the private sector to invest in the development of factories for SC+ in Rwanda and Ethiopia</td>
<td>• Governments will purchase SC+ to reach vulnerable children through social protection platforms</td>
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<tr>
<td>• Engagement with smallholder farmers through WFP’s Purchase for Progress (P4P) initiative to procure raw ingredients</td>
<td>• Mothers will be able to purchase affordable complementary foods in local markets</td>
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Governments of Ethiopia and Rwanda are prioritizing increasing access to good quality comp foods (6-23 mos) use of social safety nets

- Factories will provide guaranteed markets for soya and maize, stabilize prices and help 100,000 smallholder farmers increase income
- Large scale, globally competitive food processing companies will create employment opportunities
Stunting prevention needs a multistakeholder approach
...but we should never forget that an adequate intake of all nutrients is a prerequisite to prevent stunting