INTRODUCTION TO RICE FORTIFICATION

Peiman Milani

Project Director
Maternal and Child Health and Nutrition
PATH
pmilani@path.org
The Big Picture of Malnutrition

- Malnutrition
  - Undernutrition
    - Stunting
    - Underweight
    - Wasting
    - Micronutrient Deficiencies
  - Overnutrition
    - Obesity
    - NCDs

NCDs: Non-communicable diseases
Micronutrient deficiencies place a heavy burden on the health and economy of nations

- 2 billion People worldwide suffering from micronutrient deficiencies
- 190 million Preschoolers affected by vitamin A deficiency
- 1.1 million Yearly deaths due to vitamin A and zinc deficiencies
- 11% Gross Domestic Product (GDP) lost in Asia and Africa as a result of undernutrition
- 136,000 Yearly deaths of women and children due to iron-deficiency anemia
- 300,000 Global birth defects due to maternal folate deficiency
- 45% Child deaths caused by undernutrition

3 Prof Robert E Black MD, Prof Cesar G Victora MD, Prof Susan P Walker PhD, Prof Zulfiqar A Bhutta PhD, Prof Parul Christian DrPH, Mercedes de Onis MD, Prof Majid Ezzati PhD, Prof Sally Grantham-McGregor FRCP, Prof Joanne Katz ScD, Prof Reynaldo Martorell PhD, Prof Ricardo Uauy PhD, the Maternal and Child Nutrition Study Group. Maternal and child undernutrition and overweight in low-income and middle-income countries. The Lancet. 3 August 2013; Vol. 382, Issue 9890: Pages 427-451.
6 Ending Undernutrition: Our Legacy to the Post 2015 Generation. Lawrence Haddad, IDS in partnership with the Children’s Investment Fund Foundation.
Addressing undernutrition and micronutrient deficiencies improves health, increases productivity, and promotes economic progress.

- Prevent more than 1/3 of child deaths per year
- Reduce burden of disability for children under 5 by more than half
- Boost GDP by up to 11% in Asia and Africa
- Increase school attainment by at least one year
- Make children 33% more likely to escape poverty as adults
- Boost wage rates by 5% to 50%
- Reduce burden of disability for children under 5 by more than half
- Increase school attainment by at least one year
- Make children 33% more likely to escape poverty as adults
- Boost wage rates by 5% to 50%
- Reduce burden of disability for children under 5 by more than half
- Increase school attainment by at least one year
- Make children 33% more likely to escape poverty as adults
- Boost GDP by up to 11% in Asia and Africa

Ending Undernutrition: Our Legacy to the Post 2015 Generation
Lawrence Haddad, IDS in partnership with the Children’s Investment Fund Foundation

Scaling Up Rice Fortification in Asia
Bangkok, September 16-19, 2014
Addressing undernutrition and micronutrient deficiencies improves health, increases productivity, and promotes economic progress.

- Prevent more than 1/3 of child deaths per year
- Reduce burden of disability for children under 5 by more than half
- Boost GDP by up to 11% in Asia and Africa
- Boost wage rates by 5% to 50%
- Increase school attainment by at least one year
- Make children 33% more likely to escape poverty as adults
- Reduce burden of disability for children under 5 by more than half
- Increase school attainment by at least one year
- Make children 33% more likely to escape poverty as adults
- Reduce burden of disability for children under 5 by more than half
- Increase school attainment by at least one year
- Make children 33% more likely to escape poverty as adults

Ending Undernutrition: Our Legacy to the Post 2015 Generation
Lawrence Haddad, IDS in partnership with the Children’s Investment Fund Foundation
There are various approaches to address micronutrient deficiencies.

- Undernutrition
  - Stunting
  - Underweight
  - Wasting
  - Micronutrient Deficiencies

- Overnutrition
  - Obesity
  - NCDs

- Diet Diversification
- Supplements
- Micronutrient Powders
- Fortification
- Bio-fortification

- Salt
- Flour
- Rice
- Oils
- Condiments
- Other

NCDs: Non-communicable diseases
The best strategy is an integrated approach that includes fortification.
The best strategy is an integrated approach that includes fortification.
Staple fortification is a proven, cost-effective strategy to improve micronutrient health

- Adopted in developed countries since the early 20th century
- Ranked by the Copenhagen Consensus 2012 as one of the highest-return interventions in global development
- Salt and wheat flour fortification are illustrative success stories
Rice is an ideal fortification vehicle in many developing economies

- Staple food for 3 billion people
- Largest source of calories and core component of agriculture and nutrition in most of Asia, Africa, and Latin America (though low in micronutrients)
- Cost-effective in countries combining high per capita consumption and a consolidating rice industry
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fortificant</td>
<td>Selected micronutrient in a particular form to fortify selected food (e.g., rice, flour, salt)</td>
</tr>
<tr>
<td>Fortificant mix (premix)</td>
<td>Blend that contains several fortificants (vitamins and minerals)</td>
</tr>
<tr>
<td>Fortified kernels</td>
<td>Rice-shaped kernels fortified with the fortificant mix</td>
</tr>
<tr>
<td>Fortified rice</td>
<td>Non-fortified rice blended with the fortified kernels (at 0.5 – 2% ratio; typically 1%)</td>
</tr>
</tbody>
</table>
The process to fortify rice comprises two main steps

- **Fortifying rice**: making rice more nutritious by adding essential vitamins and minerals

- Fortifying rice is a **two-step process**:

  1. **Add vitamins & minerals (premix)**
  2. **Blend 0.5 – 2% ratio**
Rice fortification offers opportunity for social and economic impact from field to fork
Rice fortification both addresses nutritional needs and creates economic opportunity.

- Micronutrient health
- Food security
- Economic development
Rice has the potential to fill an obvious gap in current fortification programs.

Vitamin and mineral deficiencies are widespread in high rice-consuming countries.

Top Rice Consuming Countries

Iron Deficiency, Women age 15-49

Vitamin A Deficiency, Children under 6

Source: FAO2002

Rice fortification has come a long way since the 1930s.
The time to scale up rice fortification in Asia has come

- Rice fortification is a proven and cost-effective strategy to improve health and productivity of large portions of the population
- Fortifying rice – a staple food for more than three billion people – fills a significant gap in the staple food fortification landscape
- The Bangkok Workshop is a golden opportunity for us to accelerate rice fortification scale-up in Asia