# GCNF Fortification Breakout Workshop Session

## Optimizing Resilience in times of COVID-19; the importance of micronutrients and food fortification to strengthen immunity for school children

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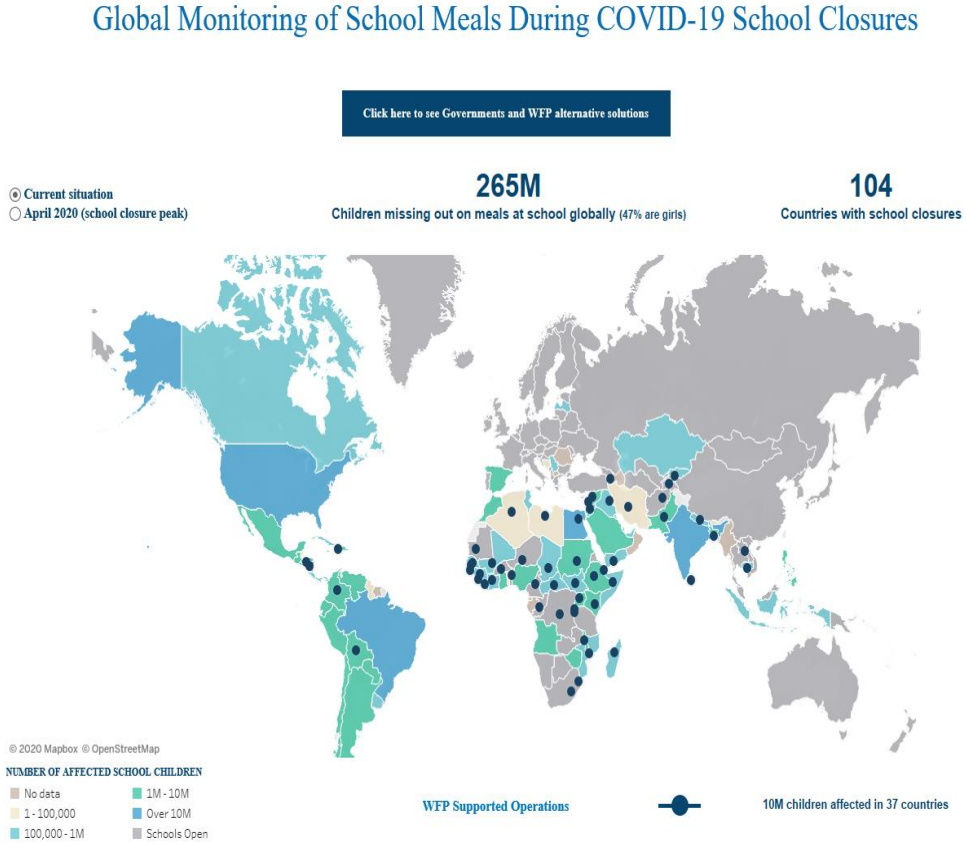
# The COVID-19 pandemic deepens the malnutrition crisis

**Lockdown situations disrupted** :

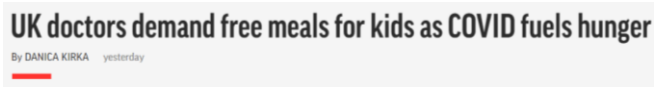
- Food supply
- Household incomes
- Access to critical services for health, nutrition & education
- Social Safety net programs delivery
- Calories and **micronutrients intake**

**Pandemic will increase the risk of all forms of malnutrition**:

- Rise in Stunting and Wasting
- Significant increase in Low Birth Weight
- Micronutrient deficiencies will increase and affect mainly women and children
- Poor nutrition in First 1000 days is likely to lead to a **COVID generation** of children

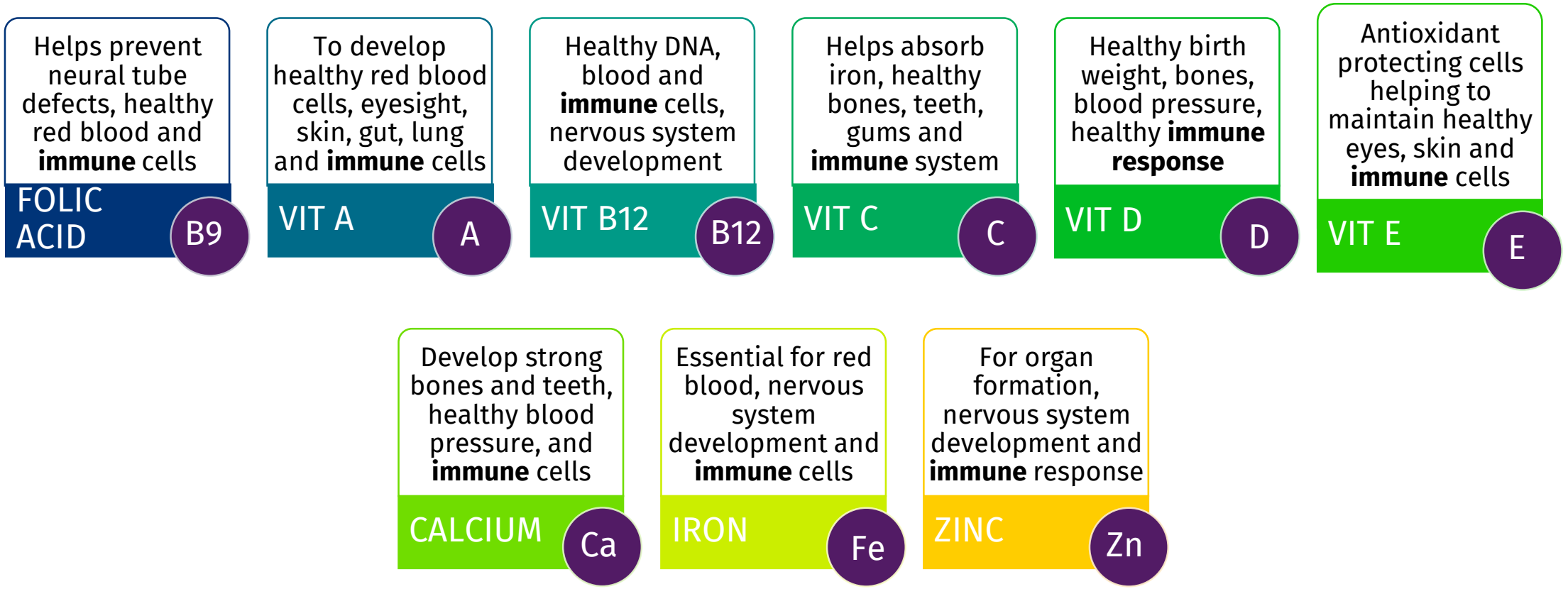



World Food Programme: https://cdn.wfp.org/2020/school-feeding-map/





# Micronutrients support in health & immunity




- Micronutrients play a role in many functions including **immunity**
- **Food fortification** can improve dietary quality, fill population nutrient gaps, and deliver health benefits to the population at large

# Staple Food Fortification is a powerful practice to address micronutrient deficiencies across the population

Food fortification which adds essential vitamins and minerals to commonly consumed foods such as **maize/wheat flour, sugar, edible oil, rice and salt**, is one of the most cost-effective, proven interventions that is readily available to address vitamin and mineral deficiencies.

48% industrially milled maize flour is fortified

30% industrially milled wheat flour is fortified

1% industrially milled rice is fortified

| Reduces critical micronutrient deficiencies | Population-wide reach | No change in dietary habits needed | Proven to be effective | Excellent return on investment | Cost-effective |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| Vitamins A, D, B1, B2, B6 & B12, niacin, folic acid, iron, zinc, iodine etc. | From children to the elderly, anyone consuming staples will be reached, ensuring maximum impact. | Foods that are fortified are already commonly consumed, e.g. wheat, maize, rice, cooking oil, sugar & salt. | The evidence proves staple food fortification can address serious health concerns and boost human health and productivity. | Eliminating deficiencies creates healthy, productive populations, and proves to provides one of the highest social ROIs. | Extremely affordable and inexpensive, yet strong impact and proven returns. |

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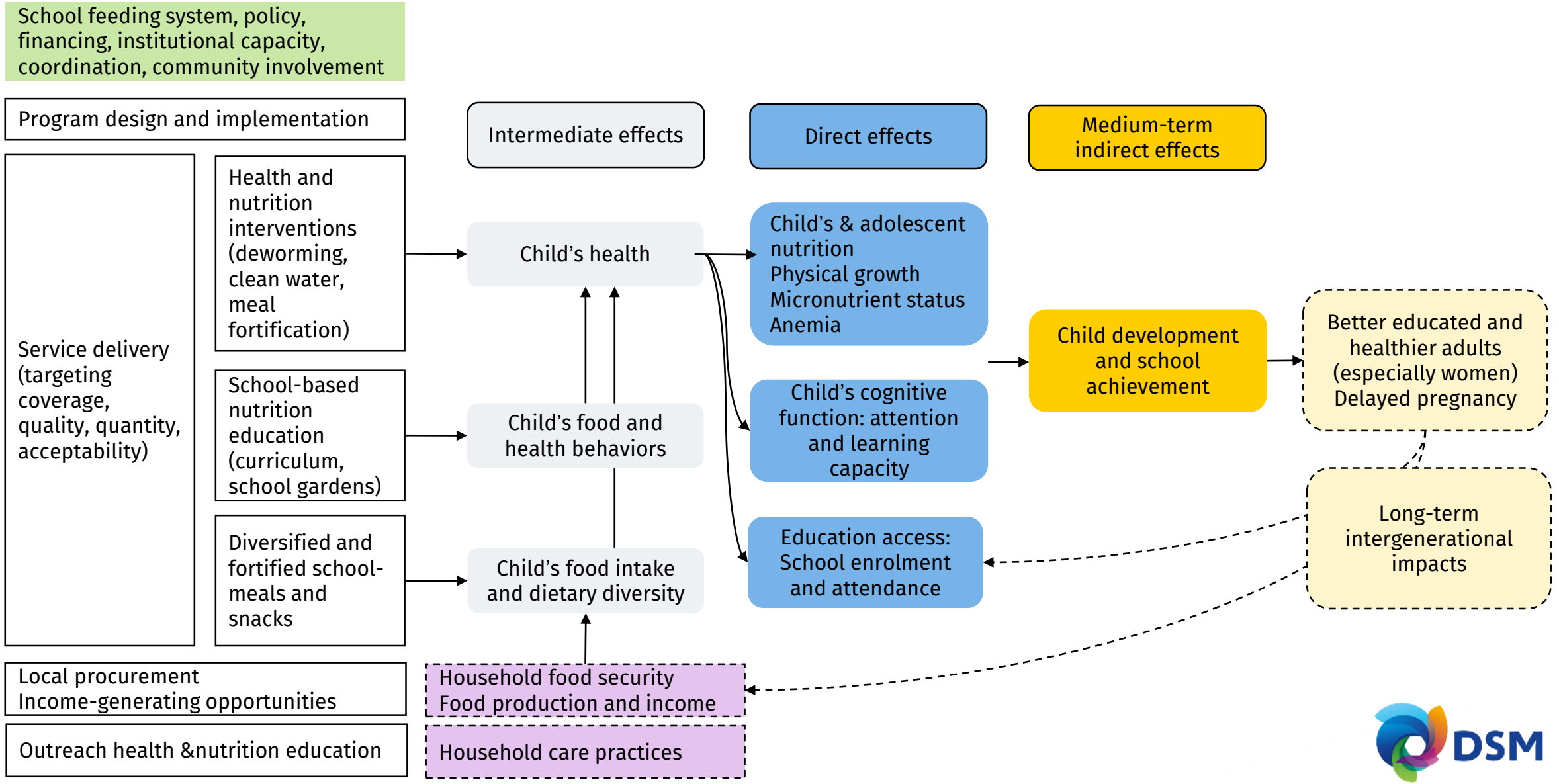
# Why school meal programs?

**Every day, millions of children around the world go to school on an empty stomach** – hunger affects their concentration and ability to learn. There are also millions of children – particularly girls – who simply do not go school because their families need them to help in the fields or perform domestic duties. In conflict-affected countries, where children are twice as likely to be out of school than their peers in stable countries – 2.5-times more likely in the case of girls.



World Food Programme: Smart School Meals 2017

# Pathways and entry points for nutrition-sensitive school-feeding




Adapted from Watkins K 2015, Sensitive to Nutrition? A literature review of school feeding effects in the child development lifecycle. PCD

# Opportunities for school meal programs

- School meals provide safety nets, incentivize school enrolment, and regular attendance
- School meals programs ideally offer a complete package:
  - Nutrition education
  - Nutrient dense food provision
  - School-based health and nutrition services such as deworming
- Nutritious school meals can offer benefits to schoolchildren, e.g.
  - Improved micronutrient status
  - Support physical and cognitive function
- School meals provide an opportunity
  - for different actors to join forces
  - for countries to contribute to their nutrition goals



World Food Programme: https://www.wfp.org/school-meals

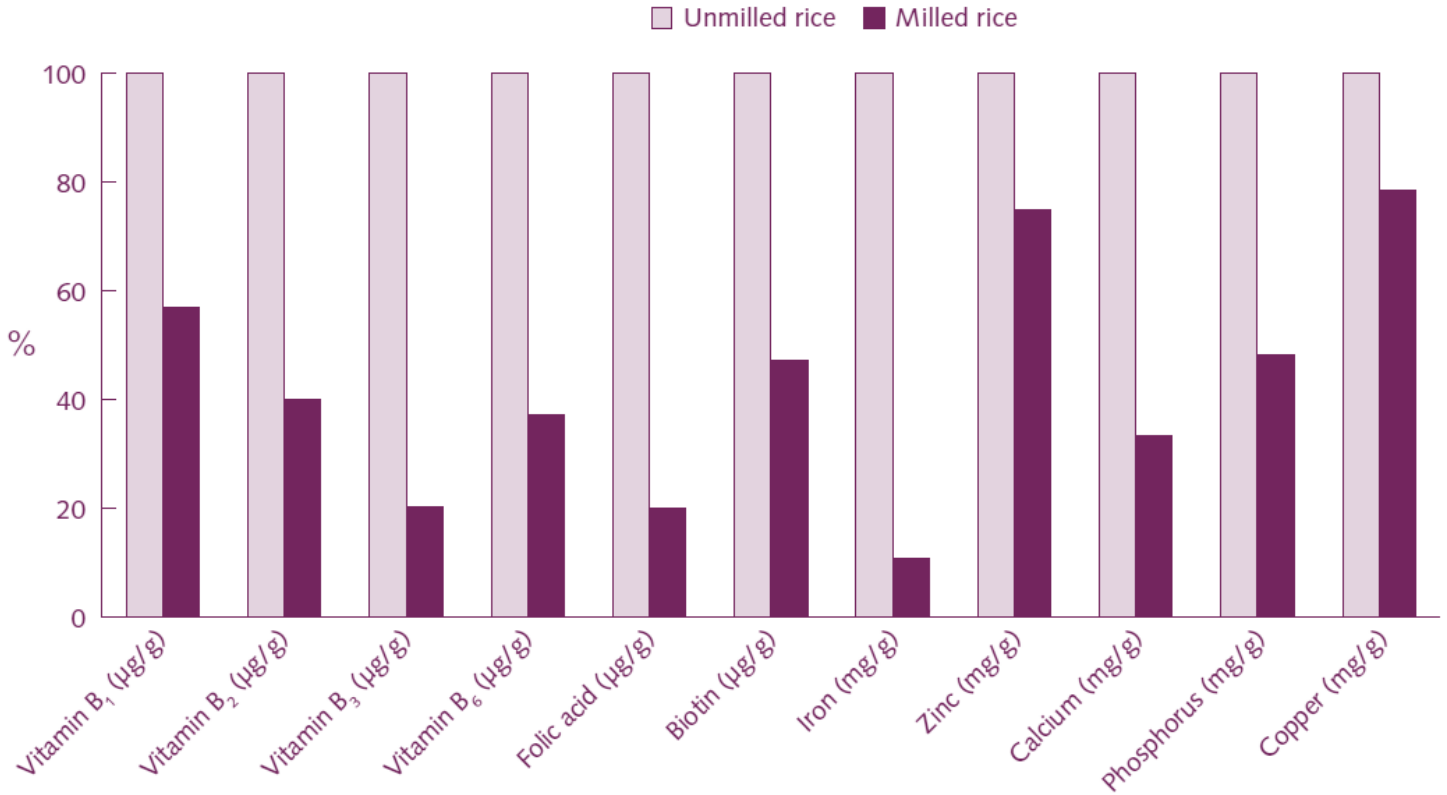
# Fortified foods as part of school menu's

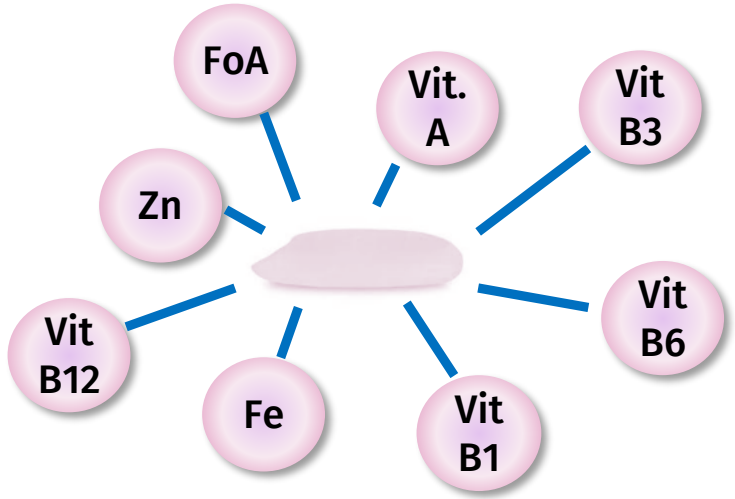
- Of the countries surveyed in the Global Survey of School Meal Programs, 87% of school meal programs  cite the goal of improving students' nutrition among their objectives.

- 68% Of programs serve fortified foods on the school menu; common fortified food items include oil, salt, grains/cereals (including rice), and corn-soy blend or biscuits. The most common micronutrients added include iron, iodine, vitamin A, zinc, and folic acid, among others

| | | % of programs that include... | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Objective to meet nutritional goals | Nutritionists involved | Fortified foods | Special training for cooks / caterers in nutrition | Objective to reduce obesity | Micronutrient supplements | Biofortified foods |
| Region | Sub-Saharan Africa | 88 | 65 | 67 | 58 | 9 | 27 | 15 |
| | South Asia, East Asia & Pacific | 83 | 64 | 73 | 81 | 23 | 25 | 19 |
| | Middle East & North Africa | 100 | 71 | 50 | 50 | 43 | 33 | 0 |
| | Latin America & Caribbean | 78 | 100 | 89 | 86 | 44 | 0 | 0 |
| | North America, Europe & Central Asia | 89 | 71 | 56 | 78 | 56 | 0 | 0 |
| Income group | Low income | 90 | 60 | 68 | 62 | 6 | 25 | 15 |
| | Lower middle income | 85 | 71 | 69 | 67 | 21 | 34 | 6 |
| | Upper middle income | 76 | 75 | 74 | 73 | 29 | 7 | 28 |
| | High income | 94 | 85 | 53 | 86 | 76 | 0 | 0 |
| All | | 87 | 69 | 68 | 67 | 23 | 22 | 12 |

# Rice fortification: adding back the micronutrients




Muthayya Food Nutr Bull 2012

# Fortified rice in schoolchildren

| Author | Country | Age | Group | Fortificants | Reduced anemia | Iron status improvement | Anemia parameters | Iron status parameters | Nutrition status parameters | Health outcomes |
|---|---|---|---|---|---|---|---|---|---|---|
| Angeles-Agdeppa 2018 | Philippines[2a] | 6–8 y | Schoolchildren | 2 groups: FePP and FeSO4 | | | ↑ Hb | | | |
| Angeles-Agdeppa 2008 | Philippines[2b] | 6–9 y | Schoolchildren | Iron | √ | — | ↑ Hb<br>↓ Anemia | — Ferritin | | |
| Moretti 2006 | India[8] | 6–13 y | Schoolchildren | Iron | — | — | — Hb<br>— Anemia | — Iron status parameters | | |
| Radhika 2011 | India[9] | 5–11 y | Schoolchildren | Iron | — | √ | — Hb<br>— Anemia | ↑ Ferritin<br>↓ Iron deficiency | | |
| Zimmermann 2006 | India[10] | 5–9 y | Schoolchildren | Iron | — | √ | — Hb<br>— Anemia | ↑ Transferrin receptor<br>— Serum ferritin<br>↓ iron deficiency | | |
| Pinkaew 2013 | Thailand[11] | 4–12 y | Schoolchildren | Zinc, Iron, and Vitamin A | — | √ | ↑ Hb | — Ferritin<br>↓ iron deficiency | ↑ Serum zinc | |
| Pinkaew 2014 | Thailand[12] | 8–12 y | Schoolchildren | Zinc, Iron, and Vitamin A | — | √ | | | ↑ Serum vitamin A | |
| Thankachan 2012 | India[13] | 6–12 y | Schoolchildren | Iron (two doses) | — | — | — Hb | — Iron status parameters | ↑ Vitamin B12<br>↓ Homocysteine | ↑ Physical<br>— Cognitive performance |
| Perignon 2016<br>Florentino 2018<br>Kuong 2019<br>De Gier 2016 | Cambodia[14,18, 24,26] | 6–16 y | N=2440 Schoolchildren | vitamin A, thiamin, vitamin B6, B12, folic acid, niacin, iron and zinc | √ | √ | ↑ Hb<br>↓ Anemia | ↑ Ferritin<br>↑ Transferrin receptor | ↑ Folate status<br>↑ Zinc status<br>↓ Zinc deficiency<br>↓ Folate deficiency | ↑ Parasite infection<br>↑ Cognitive performance |
| Huo 2013 | China[25] | 11-16 y | N=320 Schoolchildren | b-carotene, thiamin, riboflavin, vitamin B3, folic acid, iron and zinc fortified rice<br>iron fortified soy sauce and VA fortified cooking oil | √ | √ | ↑ Hb<br>↓ Anemia | ↑ Ferritin<br>↓ Iron deficiency | ↑ Zinc<br>↑ Vitamin A<br>↑ Vitamin B1<br>↑ Vitamin B2 | |
| Parker 2016 | Burundi[15] | ~ 9 y | N=1071 Schoolchildren | Iron, zinc, thiamine, folic acid | — | | — Hb | | | |
| Hussain 2014 | India[4] | 5-8-y | N=222 Schoolchildren | iron, β-carotene, vitamin A, iron + vitamin A and iron + β-carotene | | | ↑ Hb<br>↓ Anemia | ↑ Ferritin<br>↓ Iron deficiency | ↑ Retinol | |

# Impact and potential of fortification to increase the micronutrient resiliency of school meals

## Summary of evidence for fortified rice in school children

### Improved nutrition status

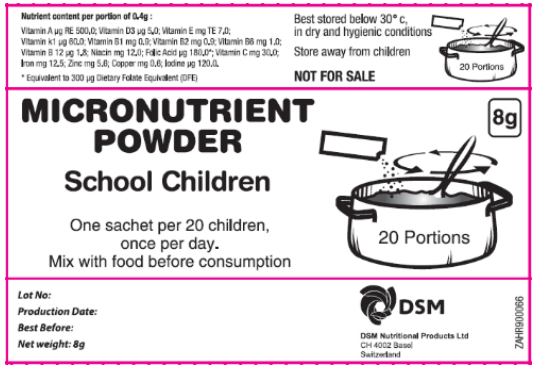
- Reduced anemia and iron-deficiency anemia
- Improved zinc and iron status
- Improved vitamin A, B1, B2, B12, and folate status

### Other health benefits

- Improved physical performance
- Improved cognition (block design test)

# Food fortification interventions targeting school children: Africa

## Micronutrient Powders





## Rice fortification

**WFP Senegal:**
- School feeding pilot; Fortified rice

**Madagascar MOH:**
- High level of traction for rice fortification

**Private sector Nigeria:**
- RTE meals with fortified rice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