

Smarter Futures and The Flour Fortification Initiative
Regional Training of Trainers Workshop on Wheat Flour Fortification
Dakar Senegal 7– 10 December 2009

Flour Fortification: A global and regional overview

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Training & Technical Support Group
The Flour Fortification Initiative

What is Flour Fortification?

- A public-private sector intervention which is ultimately driven by the consumer.
- Restores vitamins and minerals lost during the milling process.
- Improves chances of daily dietary adequacy in vitamins and minerals
- Protects population from nutritional deficits and diseases.
- Proven, Feasible, Effective and Safe

V & M's
Produced
by Modern
Technology



V & M's
Blended into
Premix



Regulated by
Government



Evaluated

With Wheat from the
Farm



Added at Flour Mill



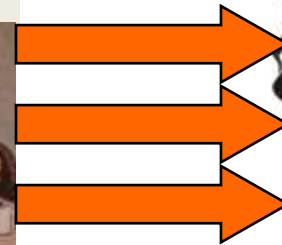
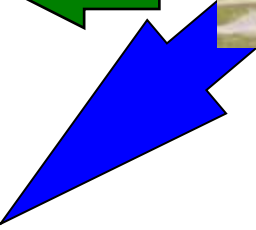
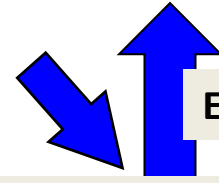
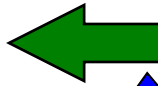
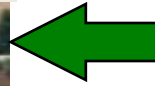
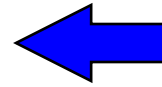
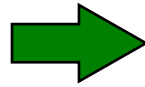
Sold to Baker
Processor
or Consumer



Consumed By Target
Groups



Protects
Health &
Prevents
Disease



Rationale for Fortification

- Cereal is Consumed by At Risk Groups
- Safe Daily Consumption by At-Risk
- Centralized Milling & Production
- Efficient Distribution
- Experience of Salt Iodization
- Many Years of fortification experience with Wheat Flour

Efficient & Inexpensive

- Mills producing the bulk of the flour are **large, modern and centrally located**.
- **Easy to adapt** to ongoing milling process. Involves **adding powder to a powder**. No other food staple as well suited.
- **No adverse affect** on appearance, baking properties or shelf-life of flour.
- Relatively **inexpensive and affordable**. Public pays **invisible price increase**.

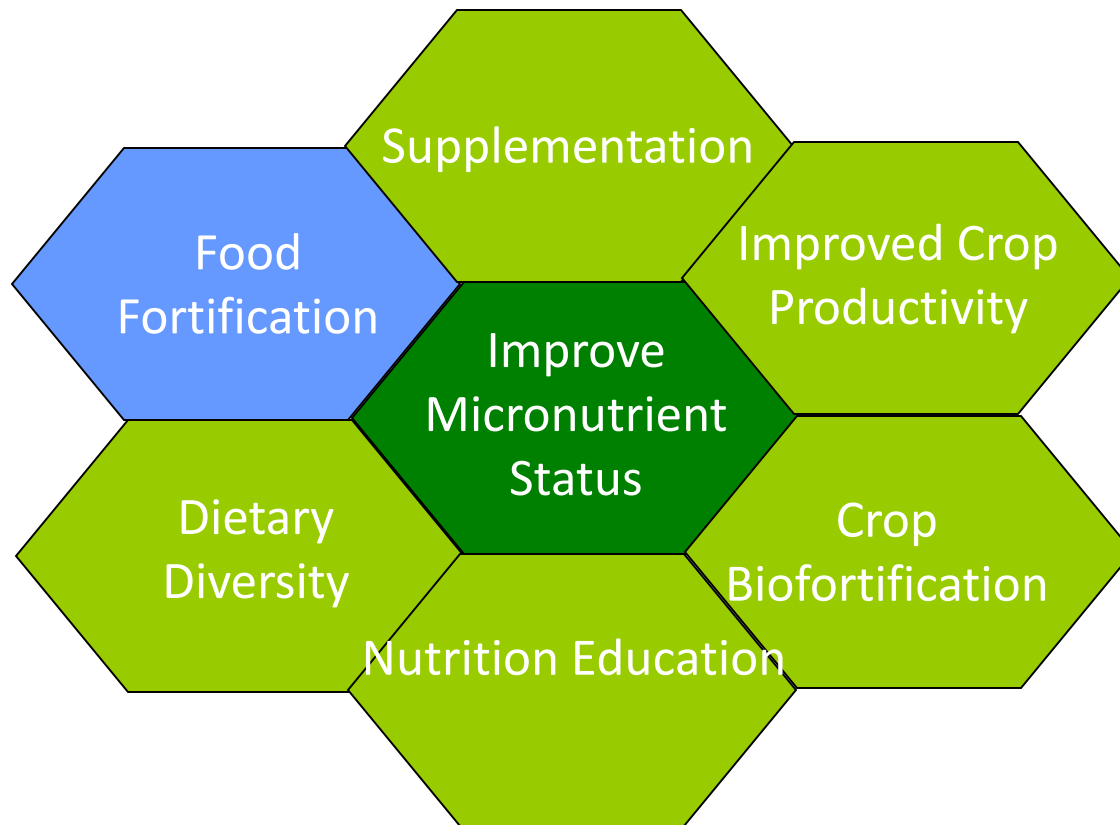
Strategic Advantages of Flour Fortification

- **Preventive Population-wide Approach**
- **Consistent Delivery Maximum Benefit**
- **Safety in Low Daily Doses**
- **Minimal Behavior Change**
- **Sustainable Financing**
- **Enhances Other Health Strategies**
- **Multiple micronutrient delivery**
- **Potential for significant economic benefit**

Safe & Effective

- **Food staple** consumed in large quantities by all ages and economic classes covering the whole population.
- **Small Daily Doses** optimally utilized by the body.
- **Safe** because people cannot eat quantity to exceed established safety thresholds.
- Added vitamins **naturally present** in the whole grain but reduced by milling process. Nothing new added.

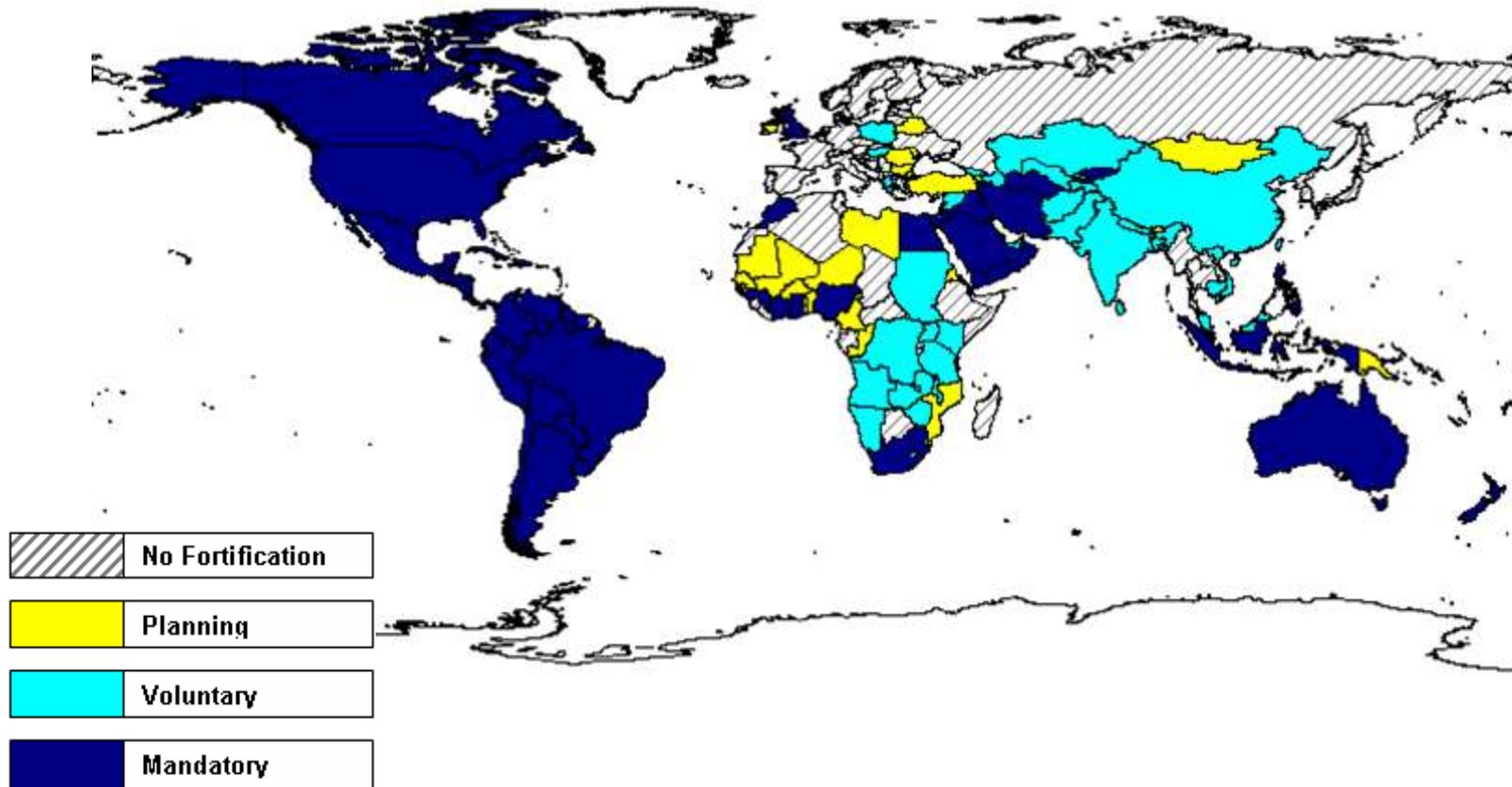
Food fortification is not the only solution: it should be part and parcel of a national nutrition programme



Flour Fortification Progress

October 2009

Fortifying with at least iron and/or folic acid



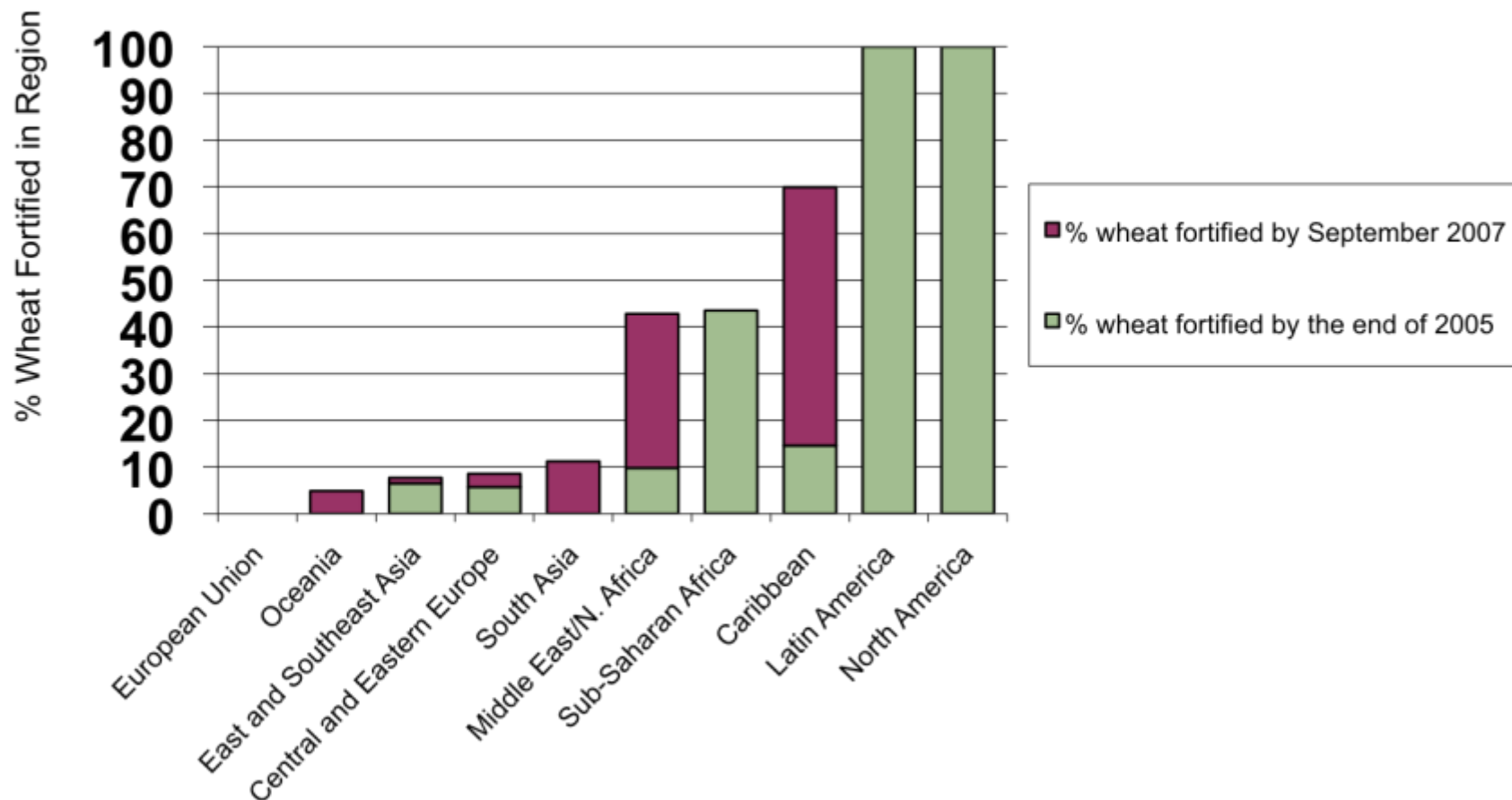
Flour Fortification Progress

Since 2004:

- ✓ 2 billion people now have access to fortified flour - 858 million more than in 2004.
- ✓ Growth in fortified flour from roller mills increased from 18% to 38%
- ✓ The number of countries with documented national regulations for mandatory wheat flour fortification increased from 33 to 59.



Percent of Wheat Fortified Between 2005 and 2007, by Region*



*Wheat values were used to make this graph. Extraction rates were therefore not taken into account.

Successful Flour Fortification Programmes

- 1940's UK Vitamin B, Iron, Calcium
- 1940's N America Vitamin Bs, Iron
- 1970's Saudi Arabia Vitamin Bs, Iron
- 1996 N America Folic Acid
- 1996 Venezuela Vitamin A, Bs Iron
- 1996 Oman Iron
- 1998 Philippines Vitamin A
- 1999 Egypt: Iron in Biscuit Flour

Successful Flour Fortification Programmes excluding Sub-Saharan Africa

- 2000 Mexico: Addition of Zinc to existing mix
- 2001 Bahrain: Iron, Folic Acid
- 2001 Indonesia: Vitamin A, Bs, Iron, FA, Zinc
- 2002-09 Jordan: Iron, Folic Acid, Vitamin A, Bs, and D
- 2002 Morocco: Vitamin Bs, Folic Acid, Iron
- 2003 Qatar: Iron FA, Kuwait: Iron , Bs, FA
- 2003 Central Asia Countries: Iron, Bs, FA
- 2005 Iran: Iron, Folic Acid,
- 2006 Iraq: Iron, Folic Acid
- 2008 Egypt: Iron, Folic Acid

Successful Flour Fortification Programmes in Sub-Saharan Africa

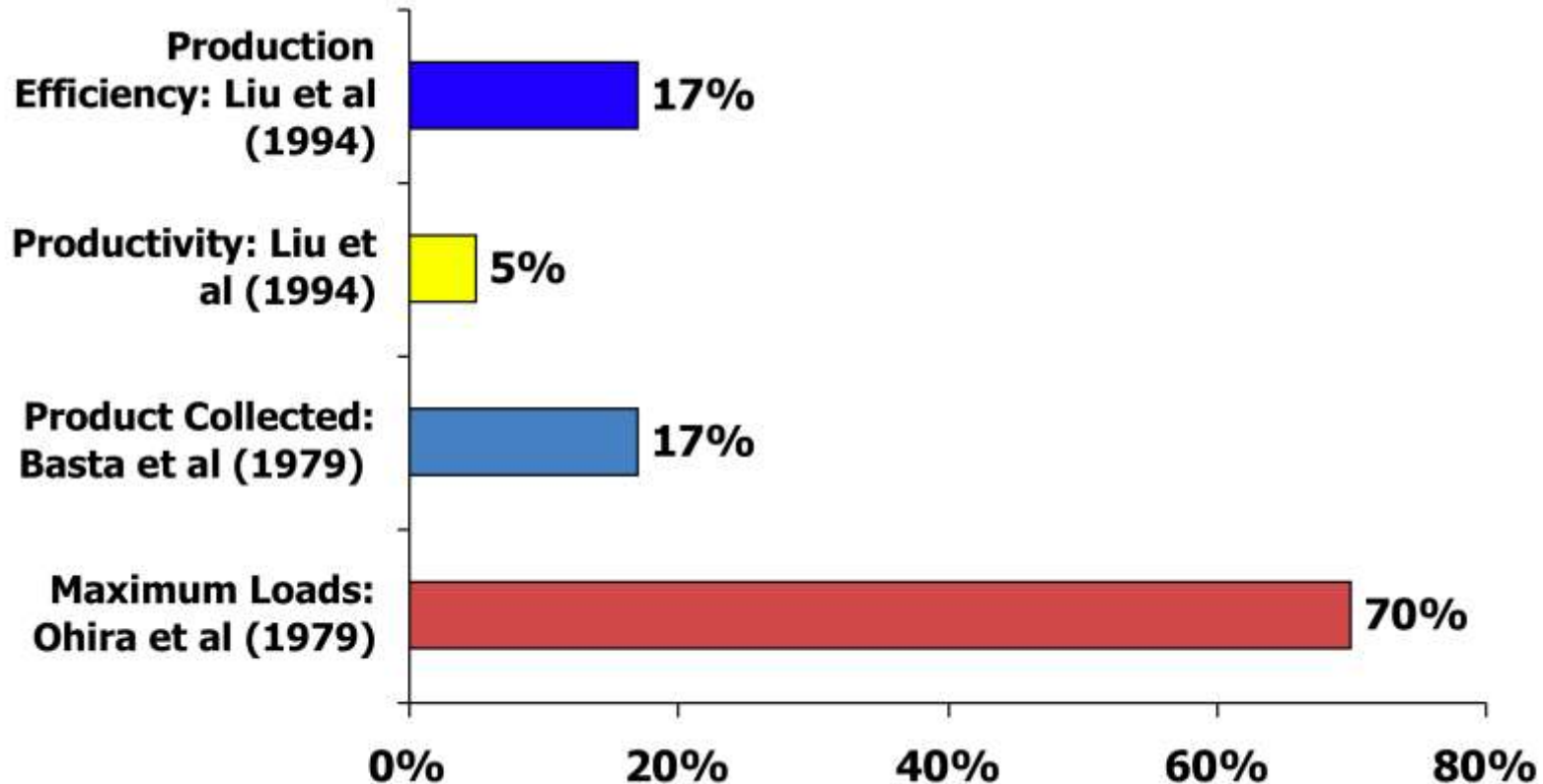
- 2003 South Africa, Wheat and Maize; Vitamin A, Bs, FA Iron, Zinc
- 2003 Nigeria: Vitamin A, Iron
- 2004 Guinea: Iron, Bs, Folic Acid
- 2005 Cote d'Ivoire: Iron, Folic Acid
- 2006 Congo: Iron, Folic Acid
- 2008 Ghana: Iron, Vitamin A, Folic Acid
- End of 2009: Benin, Burkina Faso, Mali, Niger, Senegal, Togo

A Rich and Most Affordable Source of Iron in the Diet

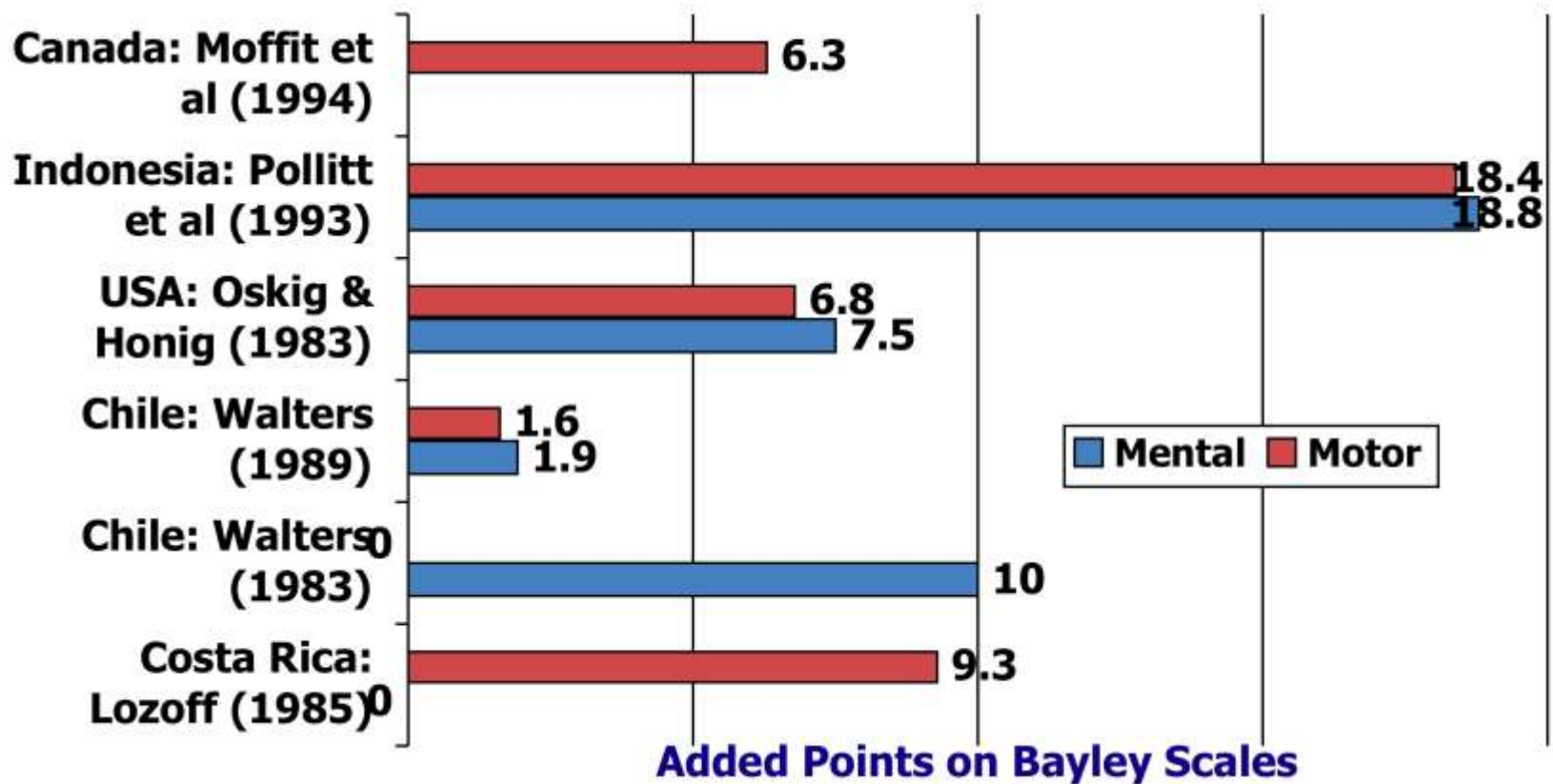
	Iron Content* Mg/100g
Fresh Fruit	
Apple	0.12
Banana	0.26
Grape	0.36
Fresh Vegetables	
Tomato	0.27
Cucumber	0.22
Eggplant	0.25
Beans	0.66
Meat	
Lamb	1.77
Bread	
White Flour	1.1
Fortified Flour	6

USDA Nutrient Data Base

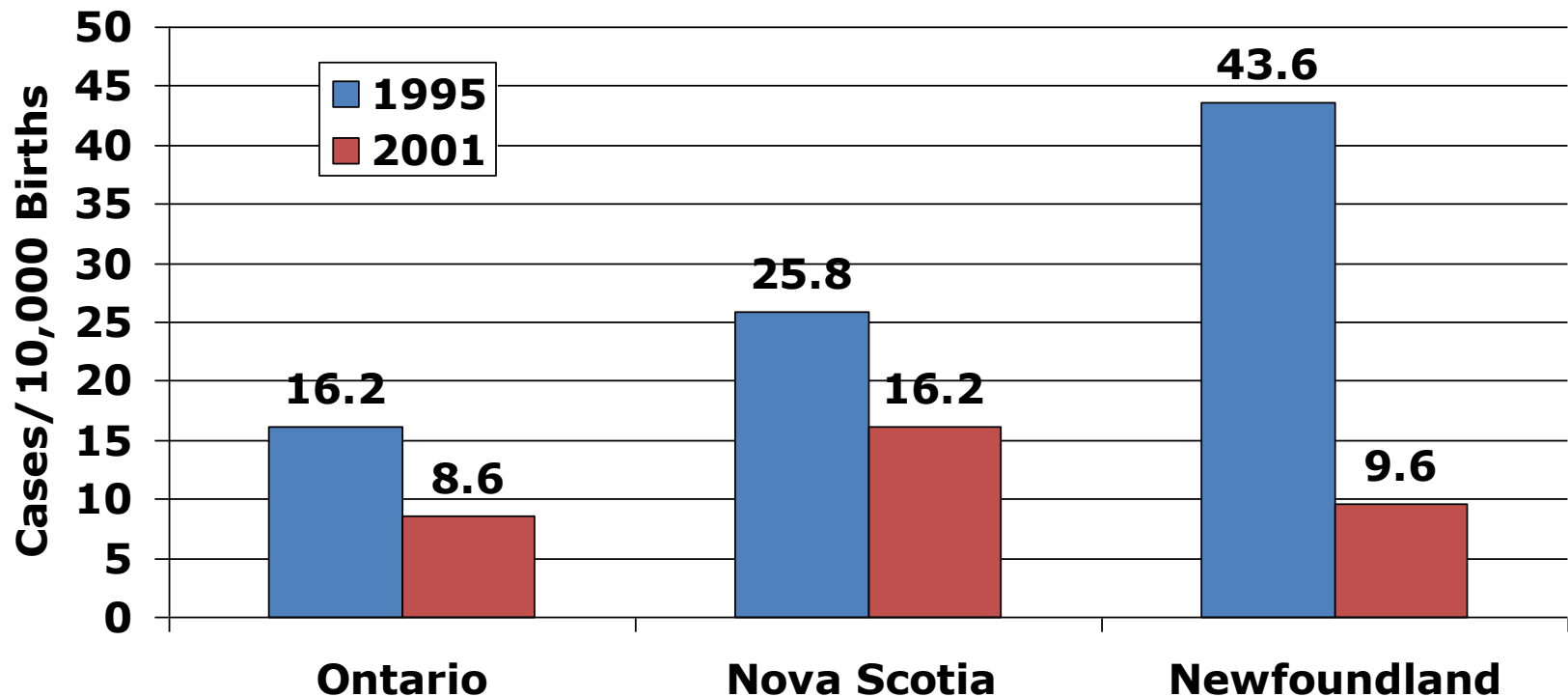
Impact on Productivity: Increased with Intervention to Correct IDA



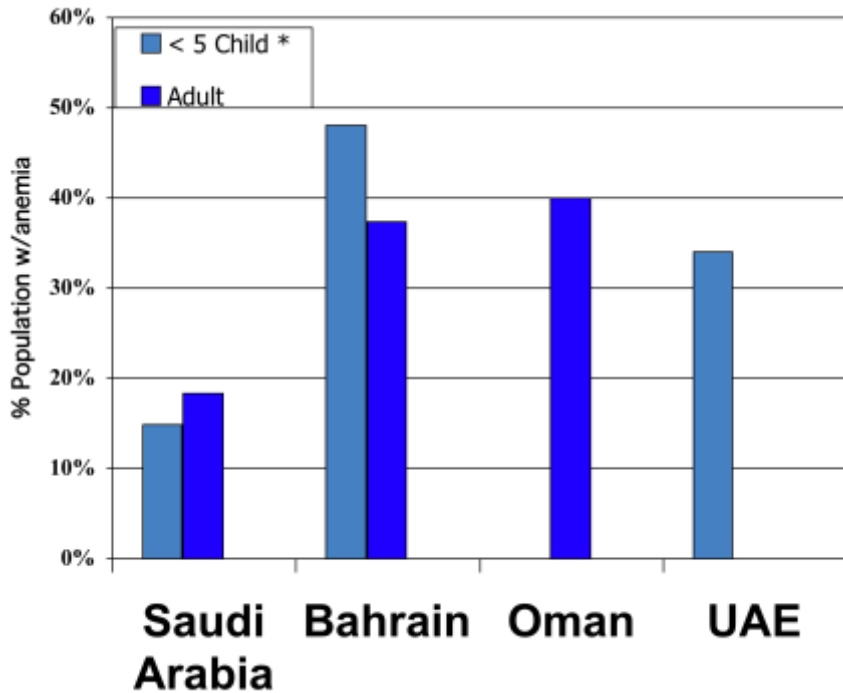
Impact on Behavioral & Cognitive Status of Children



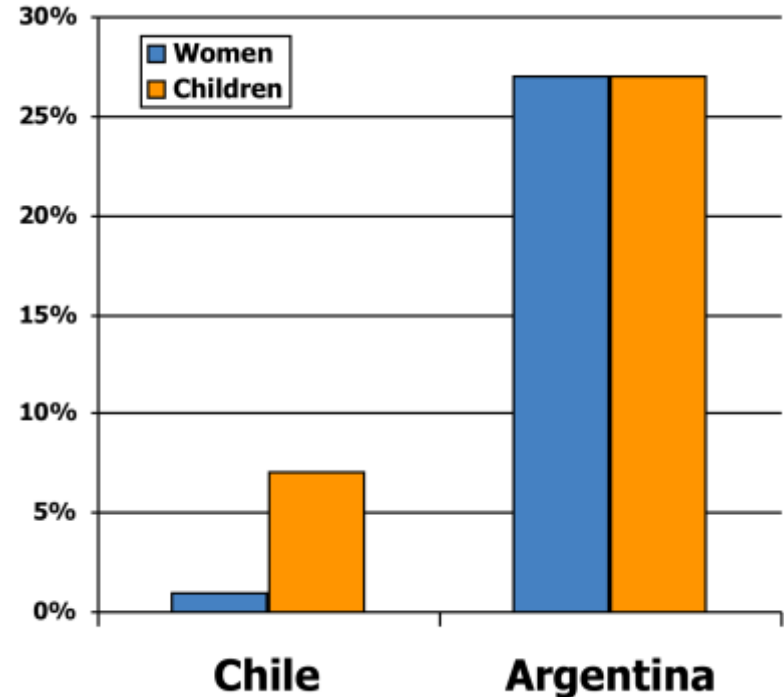
The Canada Experience with Folic Acid Fortification: 37-78% Decrease in NTDs



Comparing Rates of Anemia: Countries with vs without Fortification

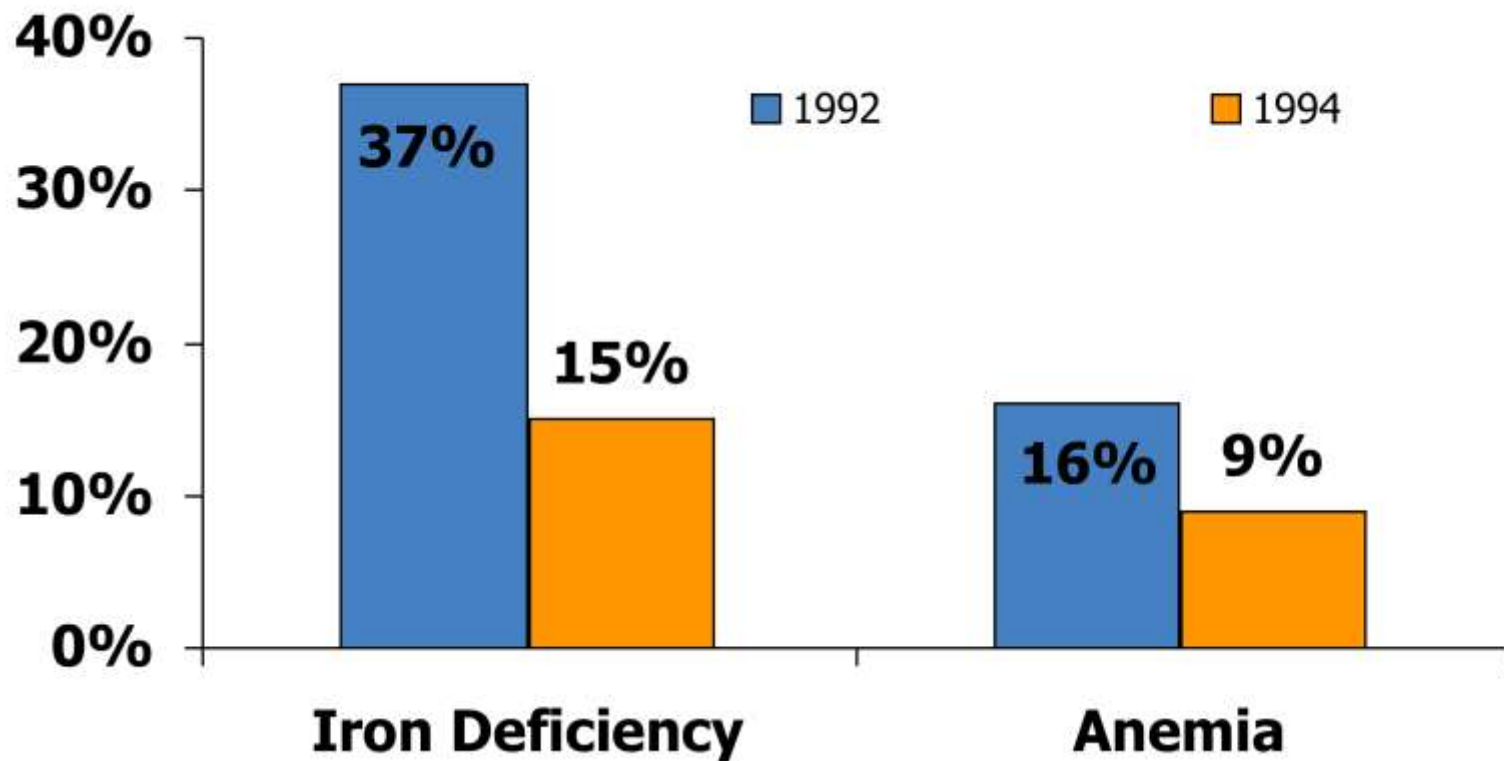


GDP: \$8,690 \$12,135 \$7,640 \$17,220



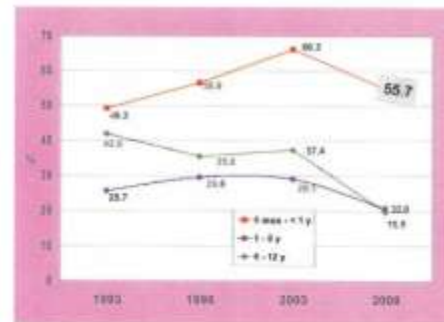
*Reported at WHO EMRO Consultation July 2000

Venezuela: Pre-Post Fortification Changes in Anemia & Iron Deficiency



Philippines National Nutrition Survey 2008 published 2009

Trends in the prevalence of anemia among children: Philippines, 1993, 1998, 2003 and 2008



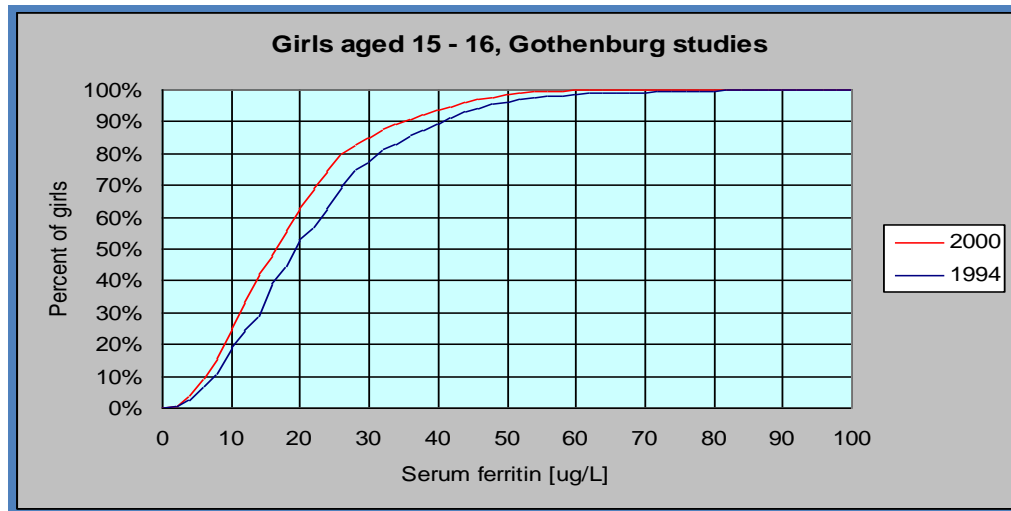
- Anemia prevalence rates among children in the 2008 survey were generally lower than the previous year survey.

Trends in the prevalence of anemia among pregnant and lactating women: Philippines, 1993, 1998, 2003 and 2008



- There was no significant decrease in anemia prevalence rate from 43.9% in 2003 to 42.5% in 2008 among pregnant women.
- Prevalence rate for lactating women was significantly lower in 2008 at 31.4% compared to the 2003 anemia prevalence rate of 42.2%.

Evidence: What happens when Flour Fortification stops: Sweden 1995.



- 27% increase in iron deficiency from 39.6% to 48.9% ($p < 0.001$)
- Despite intake of supplements increased from 8% to 17% and iron tablets from 0.8% to 4%.

Flour Fortification and Millenium Development Goals

Eradicating Vitamin and Mineral Deficiencies helps achieve 6 of the UN Millennium Development Goals



Eradicate extreme poverty and hunger



Achieve universal primary education



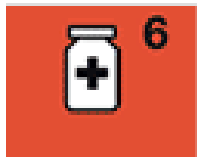
Promote general equality and empower women



Reduce child mortality



Improve maternal health

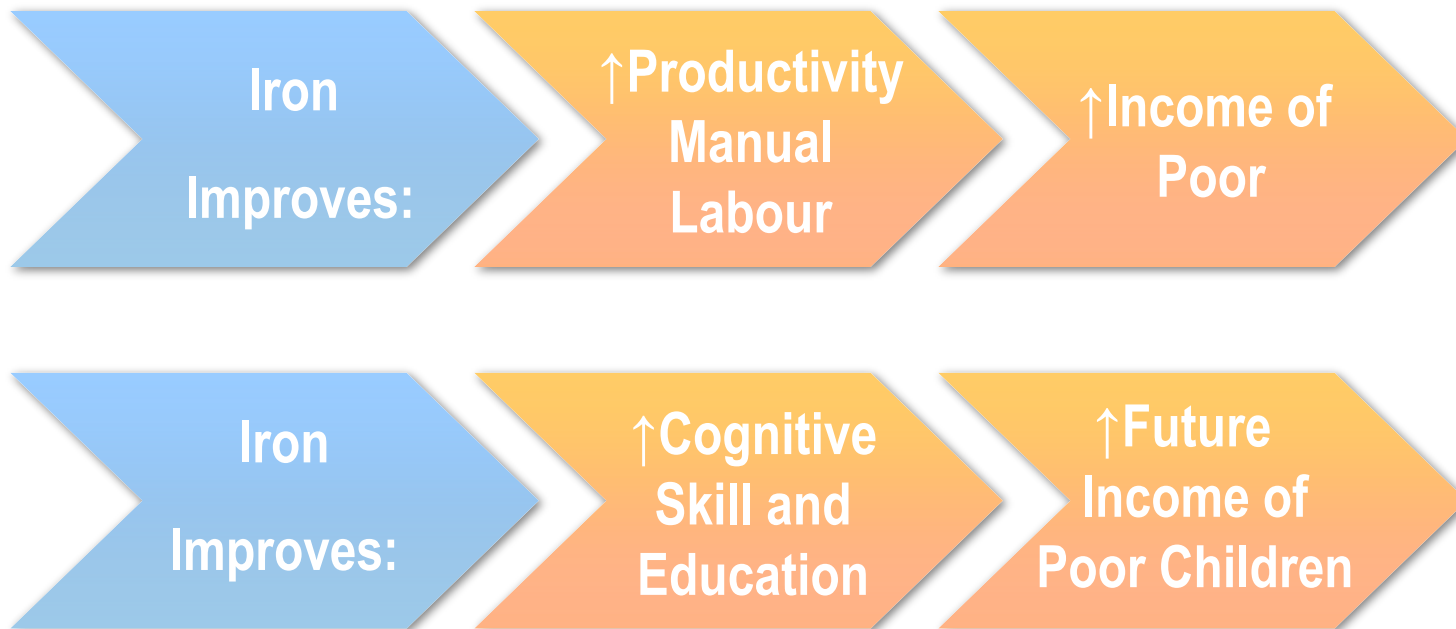


Combat HIV/AIDS, malaria and other diseases



Eradicate Extreme Poverty and Hunger

Target 1A and 2B: Income and employment



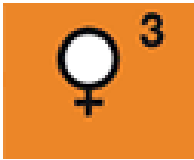
Anemia is associated with 17% lower productivity in heavy manual labour, 5% lower productivity in other manual labour, and an estimated 4% loss of earnings due to lower cognitive skills.



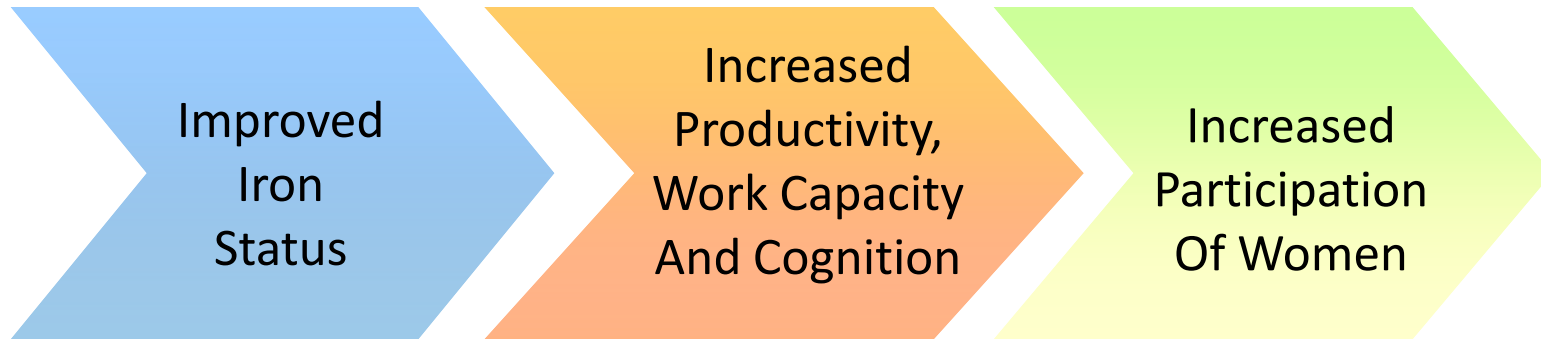
Achieve Universal Primary Education



In one study in India, eliminating anemia was associated with a 5.8 percentage point increase in school participation, and a 20% decrease in absenteeism.



Promote gender equality and empower women





Reduce Infant Child Mortality



Improve Maternal Health

Iron
Benefits:

↓ Anemia
Pregnant
Woman

↓ Perinatal
and Maternal
Mortality

Zinc
Benefits:

↑ Immune
Function

↓ Mortality
Esp. Under 2

Folic Acid
Benefits:

↓ Neural
Tubes Defects

↓ Mortality
Under 5



Combat HIV/AIDS, malaria and other diseases





Eight world-renowned economists

Jagdish Bhagwati, François Bourignon, Finn Kydland*,
Robert Mundell*, Douglass North*, Thomas Schelling*,
Vernon L. Smith*, Nancy Stokey

* Denotes Nobel prize winner

10 Development Challenges



The Copenhagen Consensus: Highest Benefit Cost Ratio

	Solution	Challenge
1	Micronutrient supplements for children (A & Zn)	Malnutrition
2	The Doha development agenda	Trade
3	Micronutrient fortification	Malnutrition
4	Expanded immunization coverage for children	Diseases
5	Biofortification	Malnutrition
10	Community based food activities	Malnutrition