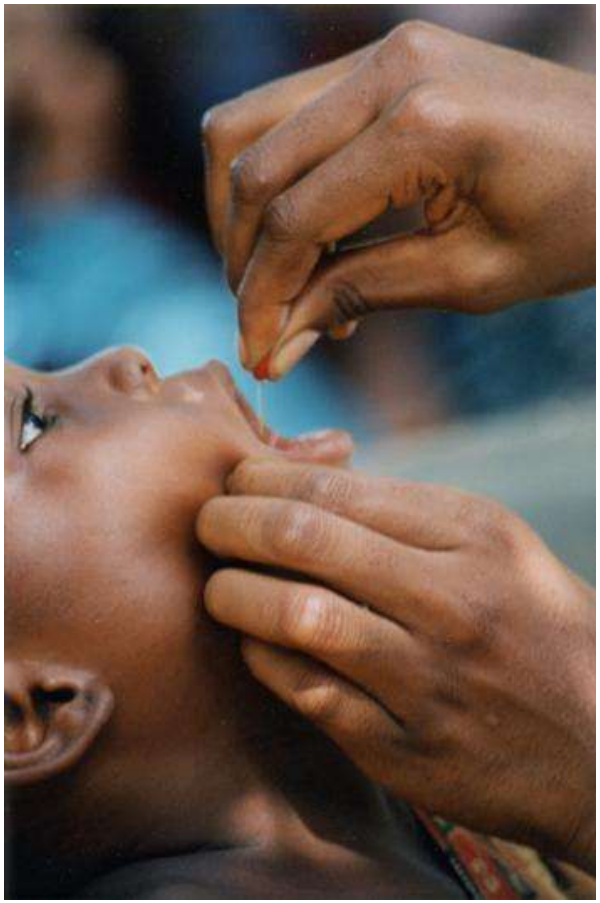
Micronutrient Initiative



Consequences of micronutrient deficiencies in Africa – Why we have to act

Dec 2009

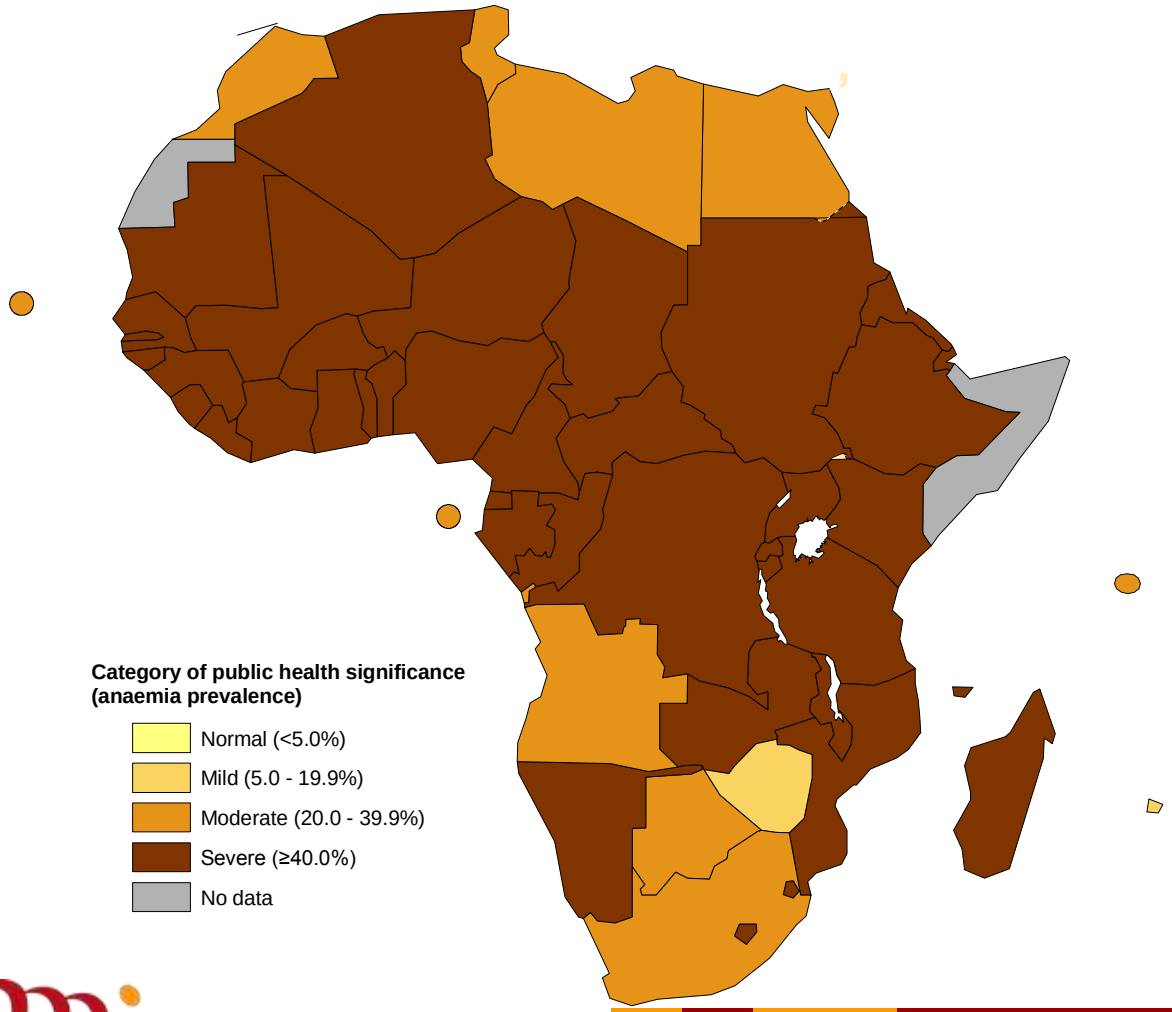
Abdulaziz Adish, MD, MPH, PhD
MI Deputy Regional Director, Africa

Introduction

Micronutrient deficiency (Vitamins & Minerals Deficiency VMD)

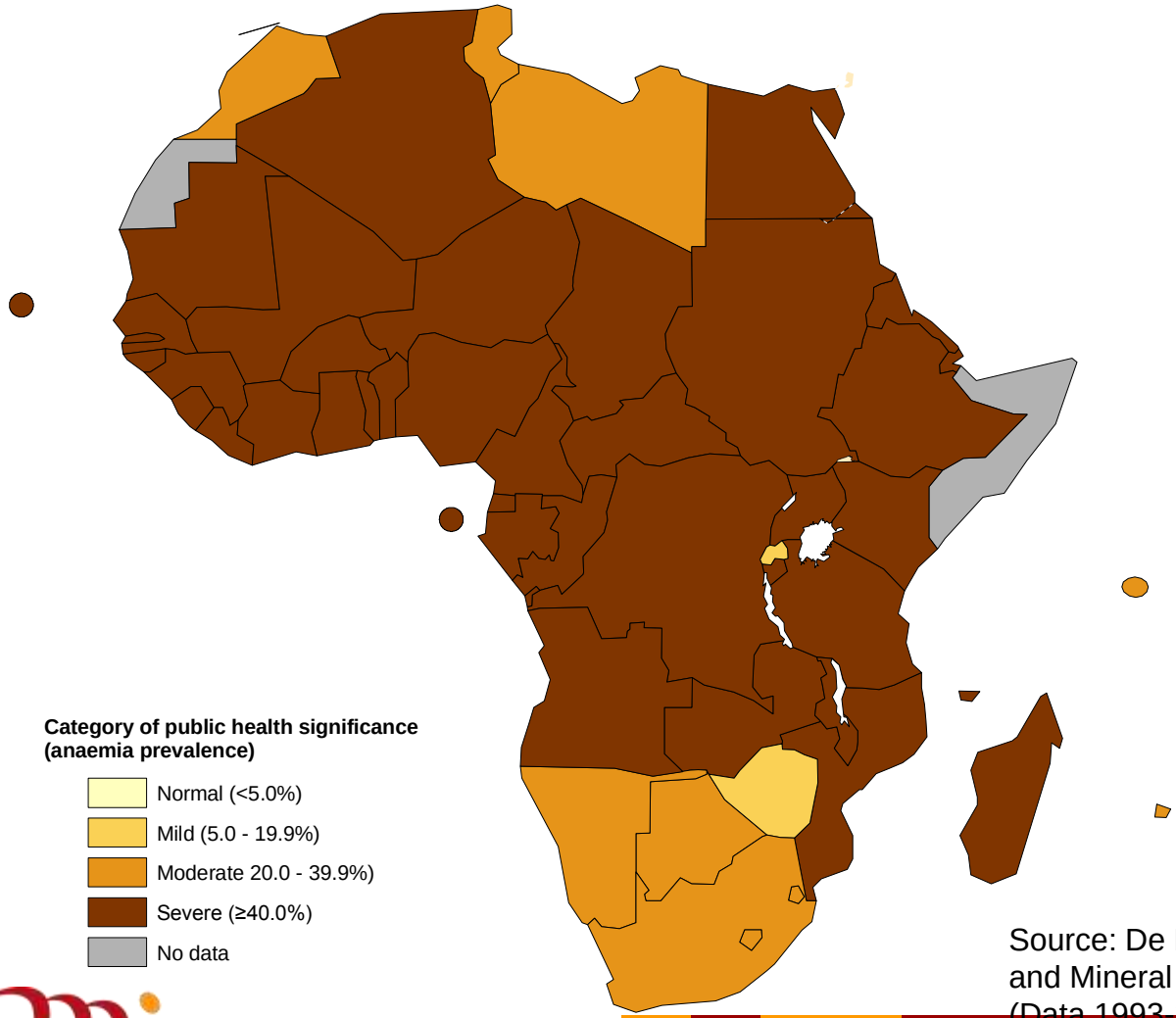
- A “new” old problem
- Known for several decades – anemia, cretinism , spina bifida and blindness
- Last decade: the importance/impact of intermediate levels of deficiencies without overt manifestations
- Mild levels of VMD: are extremely common in almost all countries

Prevalence of Anaemia in Preschool Children in Africa



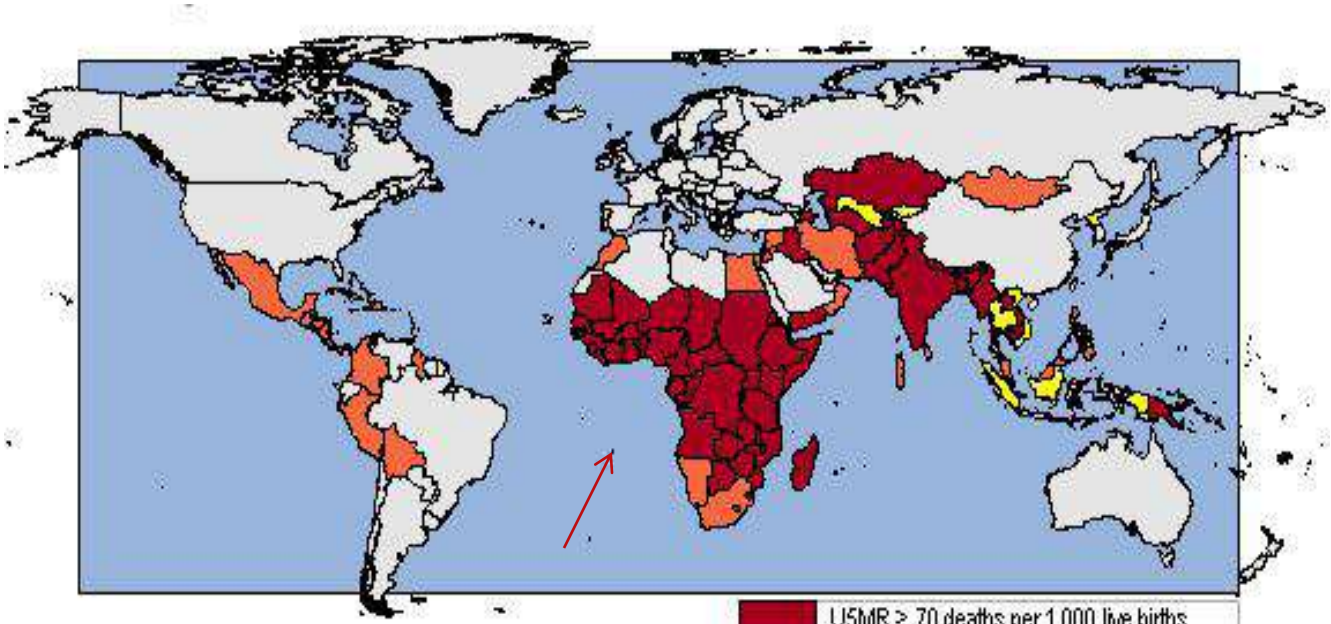
Micronutrient Initiative

Prevalence of Anaemia in Pregnant Women in Africa



Source: De Benoist B et al, 2008 and WHO Vitamin and Mineral Nutrition Information System, 2008 (Data 1993-2005)

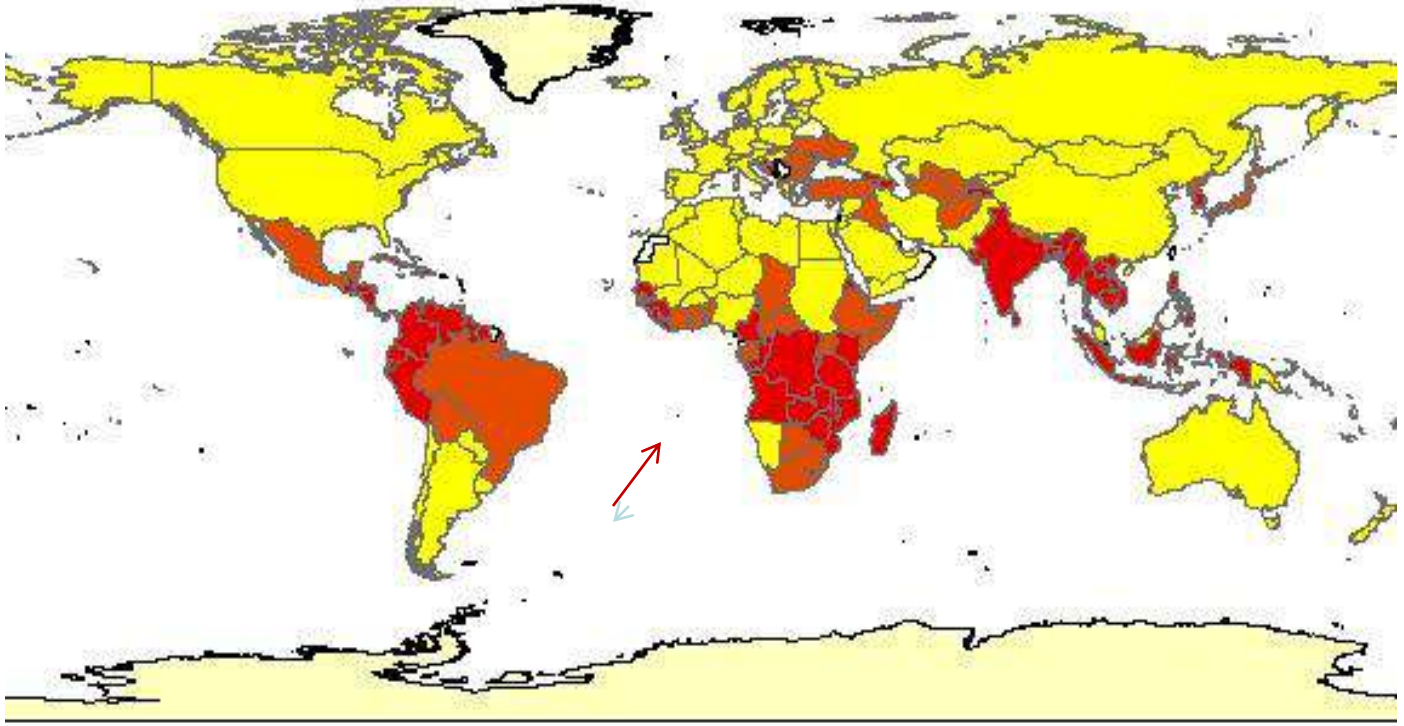
Approximately 100 countries affected Vitamin A deficiency



Source: UNICEF VAS Database; WHO Micronutrient Deficiency Information System

Note: The boundaries and the names shown and the designations used on these maps do not imply official endorsement or acceptance by the United Nations

Zinc deficiency



0-14.5% deficiency

15-24.9 %

> 25% deficiency

Consequences:

Morbidity due to common VMD

Micronutrient malnutrition

VAD: 125 million preschool children

IDD: 740 million globally

IDA: 2 billion, esp. women and children

Other

- **Folate**
- **Zinc**
- **Thiamin**
- **Others: vitamin D, B vitamins, calcium etc.**

Consequence:

Mortality due to common VMD

Vitamin A deficiency - 23% of deaths in children 6-59 months old

Zinc deficiency - 9% of deaths in children 1-47 months old (19% in children 12-47 months old) in addition to mortality attributable to vitamin A

Costs of micronutrient deficiency: 2 approaches

Human costs (global burden of disease)

Cost-effectiveness of interventions

Favored by WHO (e.g. CHOICE: Choosing Interventions which are Cost-Effective)

Economic costs (health care, work loss)

Cost-benefit of interventions

Used by development Banks

Adult productivity losses: examples

Iron deficiency anemia → lower maximal work capacity → productivity loss (heavy labor)

Iron deficiency anemia → lower endurance → productivity loss (light work)

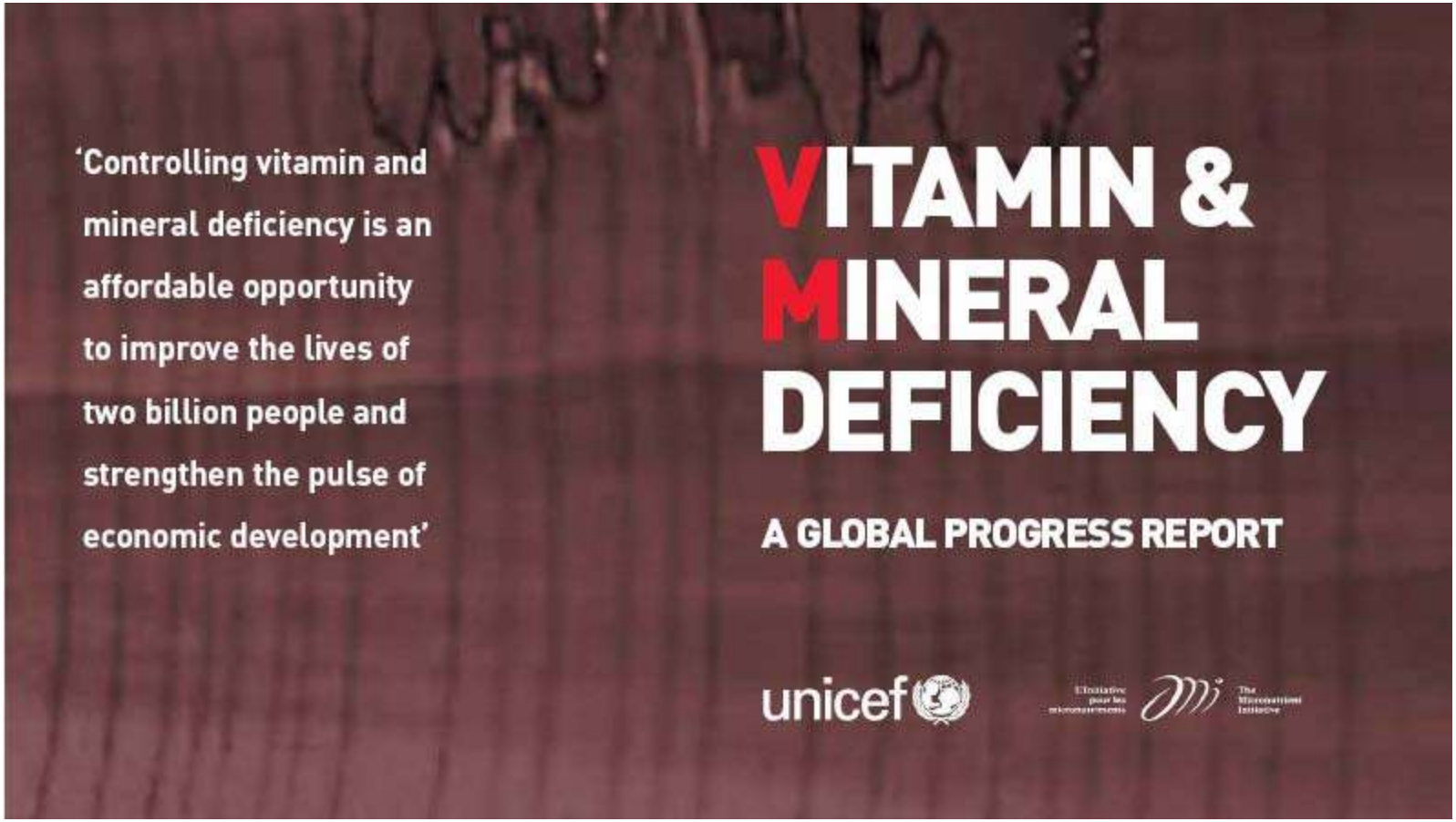
Zinc deficiency → shorter stature → lower productivity

Cognitive losses: examples

Deficiency → cognitive losses → educational losses → productivity losses (iodine, iron, vit. B-12, zinc)

Deficiency → cognitive losses → productivity losses (iodine, iron, B-12, zinc)

Deficiency → morbidity → missed school days → lost productivity (vit A)



The Micronutrient Initiative and UNICEF, 2004

Economic impact of iron supplementation

17% improvement in productivity in heavy manual labor

5% improvement in productivity in light manual labour

2.5% estimated improvement in other labour (cognitive effects); doesn't include effects via schooling

Economic impact of iodine deficiency

- 3.4% of births to a mother with goiter have zero economic productivity (cretins)
- 10.2% of births to a mother with goiter have 25% loss of economic productivity
- Remainder have 5% lower productivity (IQ is 13.5 points lower)
- Overall loss 15% per birth to a mother with goiter
- Doesn't include stillbirths, other losses

Economic impact of folate supplementation

30% ↓ heart defects (recall data, periconception)

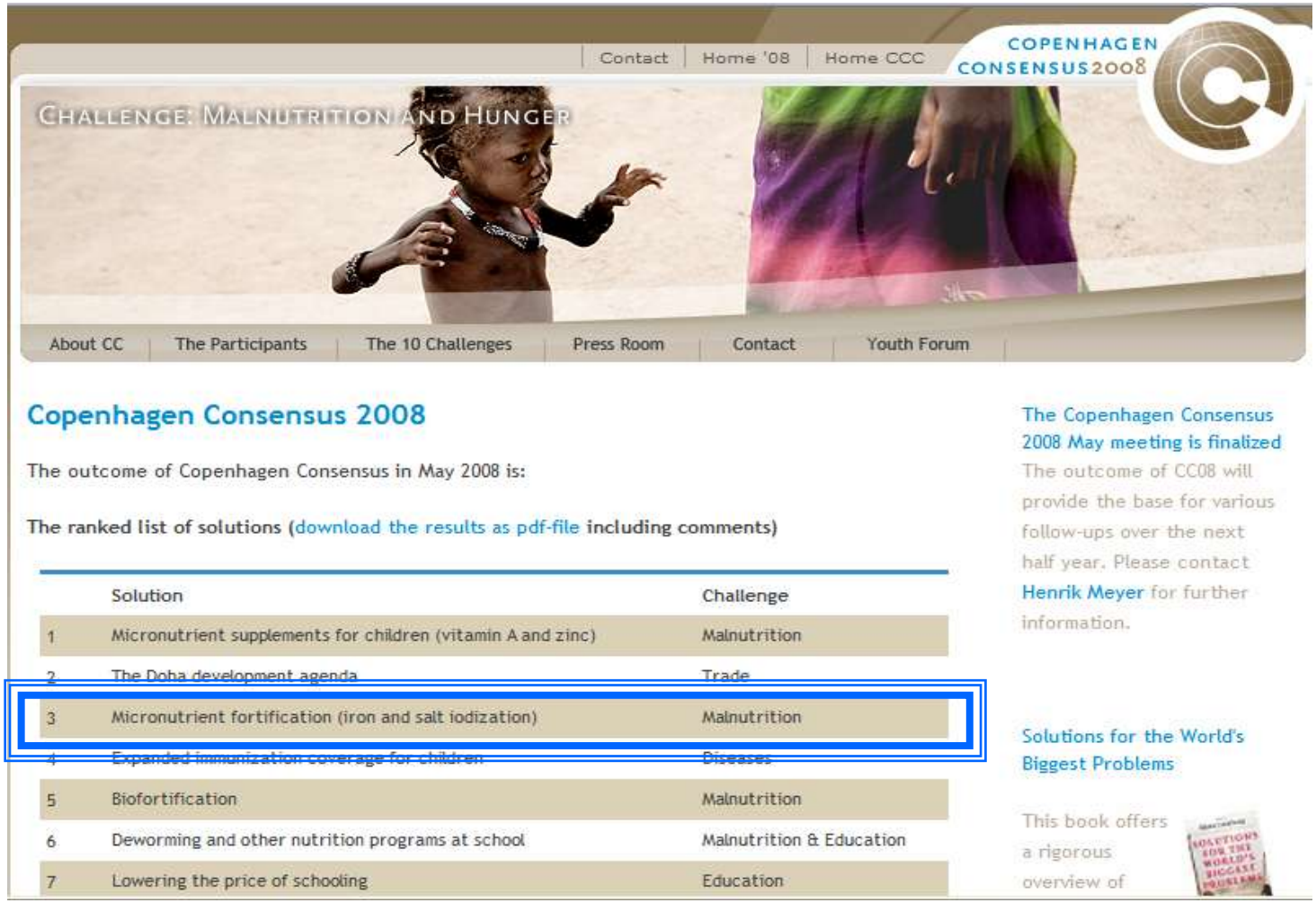
36% ↓ limb defects (same)

65% ↓ oral clefts in high-risk families (intervention/control)

50% ↓ spina bifida

22-40% ↓ in CHD mortality potentially

Fortification is Supported by Leading Economists



Contact | Home '08 | Home CCC

COPENHAGEN CONSENSUS2008

CHALLENGE: MALNUTRITION AND HUNGER

About CC | The Participants | The 10 Challenges | Press Room | Contact | Youth Forum

Copenhagen Consensus 2008

The outcome of Copenhagen Consensus in May 2008 is:

The ranked list of solutions (download the results as pdf-file including comments)

	Solution	Challenge
1	Micronutrient supplements for children (vitamin A and zinc)	Malnutrition
2	The Doha development agenda	Trade
3	Micronutrient fortification (iron and salt iodization)	Malnutrition
4	Expanded immunization coverage for children	Diseases
5	Biofortification	Malnutrition
6	Deworming and other nutrition programs at school	Malnutrition & Education
7	Lowering the price of schooling	Education

The Copenhagen Consensus 2008 May meeting is finalized
The outcome of CC08 will provide the base for various follow-ups over the next half year. Please contact Henrik Meyer for further information.

Solutions for the World's Biggest Problems

This book offers a rigorous overview of

Source: www.copenhagenconsensus.com

Eight world-renowned economists

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

* Denotes Nobel prize winner

Top solutions – renowned economists

	Solution	Challenge
1	Micronutrient supplements for children (A&zinc)	Malnutrition
2	The Doha development agenda	Trade
3	Micronutrient fortification (iron and salt iodization)	Malnutrition
4	Expanded immunization coverage for children	Diseases
5	Biofortification	Malnutrition
6	Deworming, other nutrition programs in school	Malnutrition
7	Lowering the price of schooling	Education
8	Increase and improve girl's schooling	Women
9	Community-based nutrition programs	Malnutrition

UN Millennium Development Goals

Eradicate extreme poverty and hunger

Achieve universal primary education

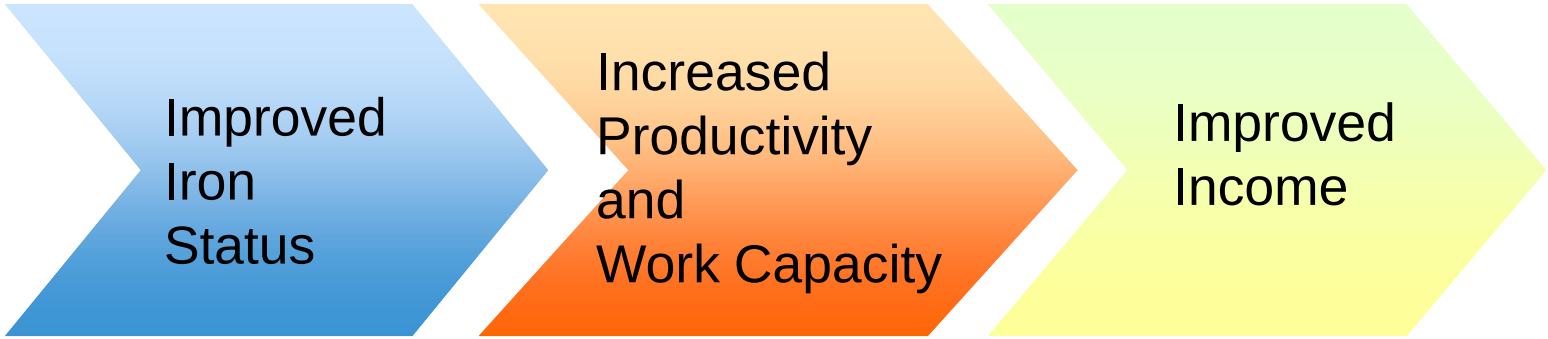
Promote general equality and empower women

Reduce child mortality

Improve maternal health

Combat HIV/AIDS, malaria and other diseases

Eradicate extreme poverty and hunger



Anemia is associated with:
17% lower productivity in heavy manual labour
5% lower productivity in other manual labour
4% loss of earnings due to lower cognitive skills

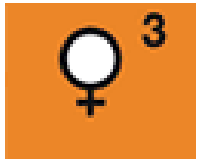
Achieve universal primary education

Improved Iron Status

Improved Cognitive Skills

Improved Abilities and Attendance

Iron deficiency affects optimal motor, social-emotional, and language development.



Promote gender equality and empower women

Improved Iron Status

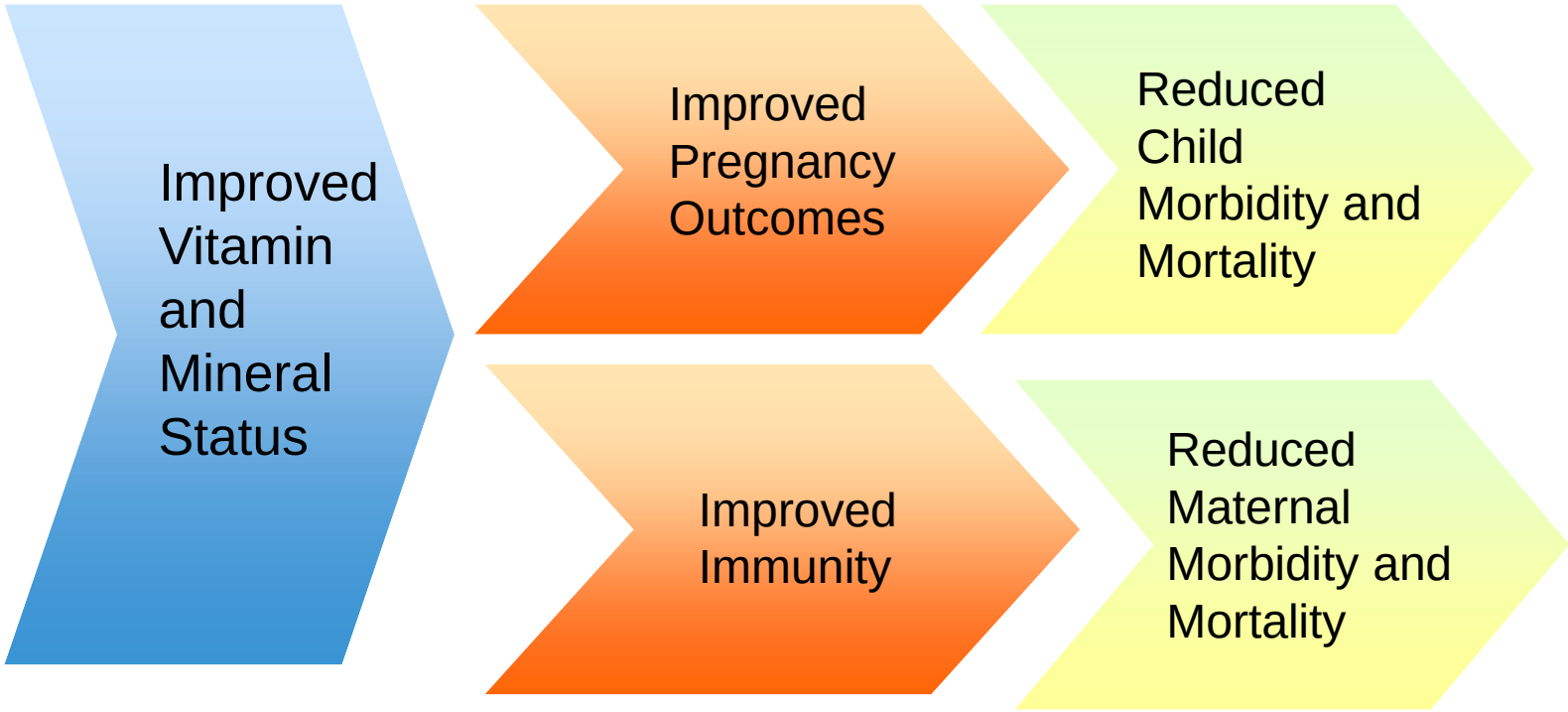
Increased Productivity, Work Capacity and Cognition

Increased Participation of Women

Some actions to achieve MDG:
Increase female role models
Increase formal and non formal education of girls
Support women's entrepreneurship

Reduce child mortality

Improve maternal health



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Combat HIV/AIDS, malaria and other diseases

Alleviating Micronutrient Malnutrition:
what works?

Making the right food choice

Support programes (e.g. consumer awareness)

Scientific and technical issues (safety/quality)

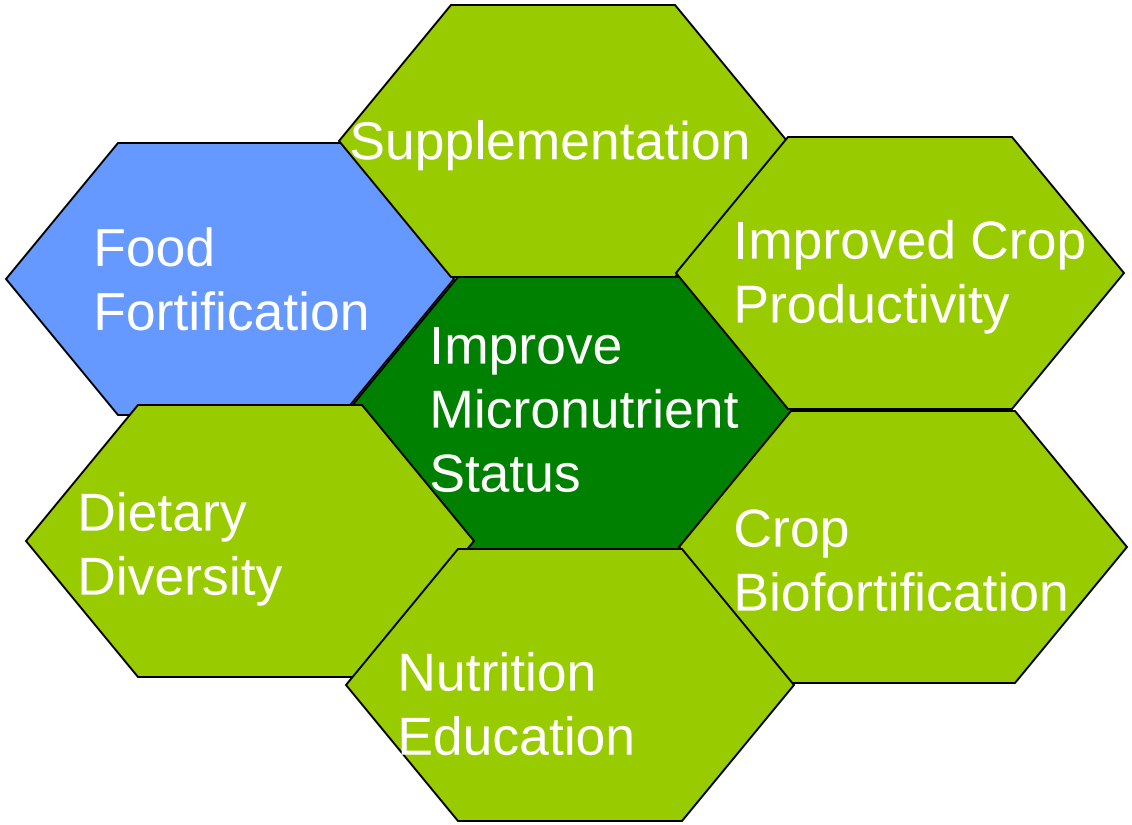
Cost-effective technologies to fortify commonly consumed foods

Nutritional enhancement of staple foods

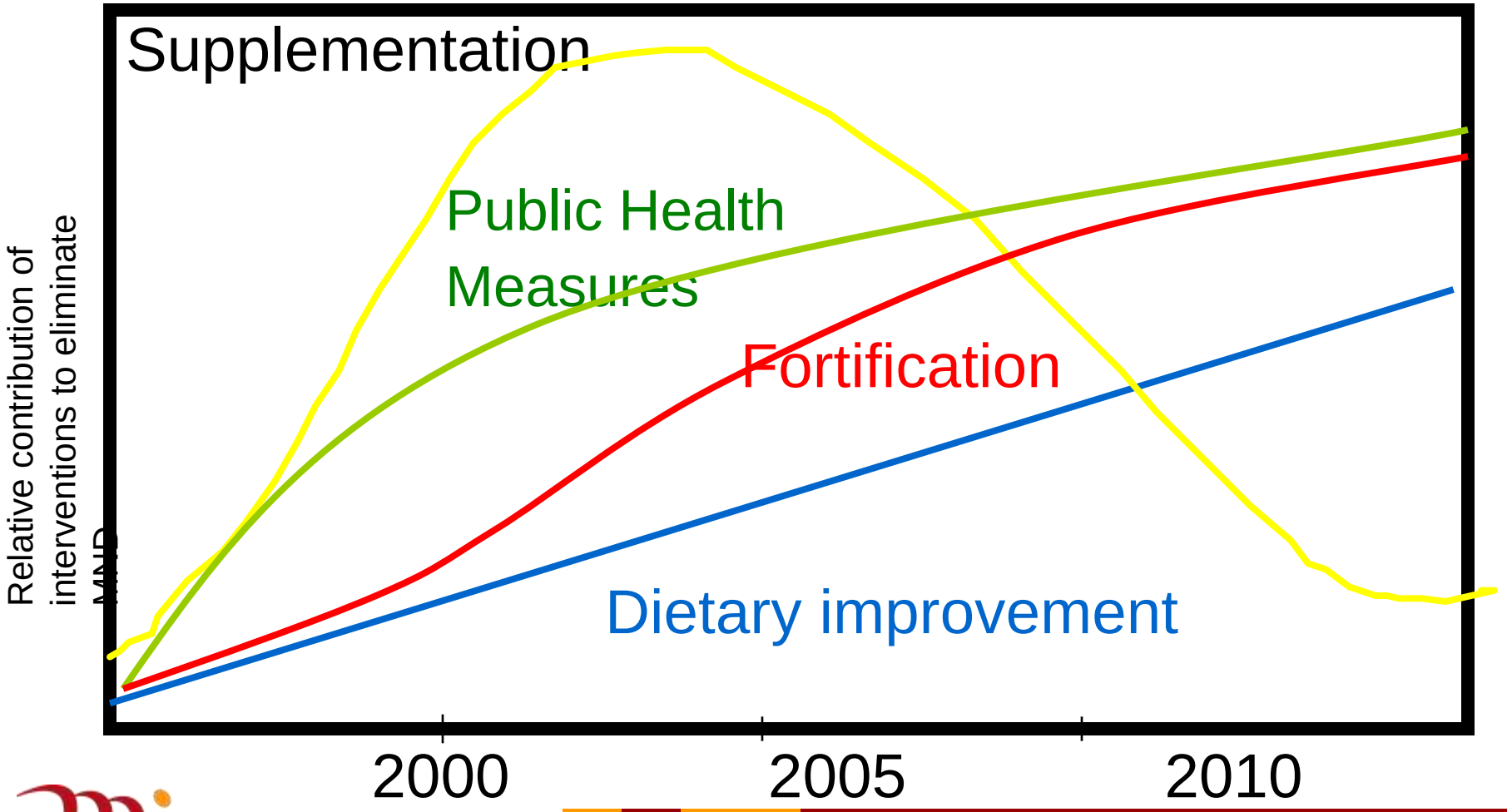
Effective programming to identify bio-available nutrient forms

Nutrient surveillance programmes to assure nutritional safety of fortified foods

Interventions to Address Vitamin and Mineral Deficiencies



Phasing of Micronutrient Interventions



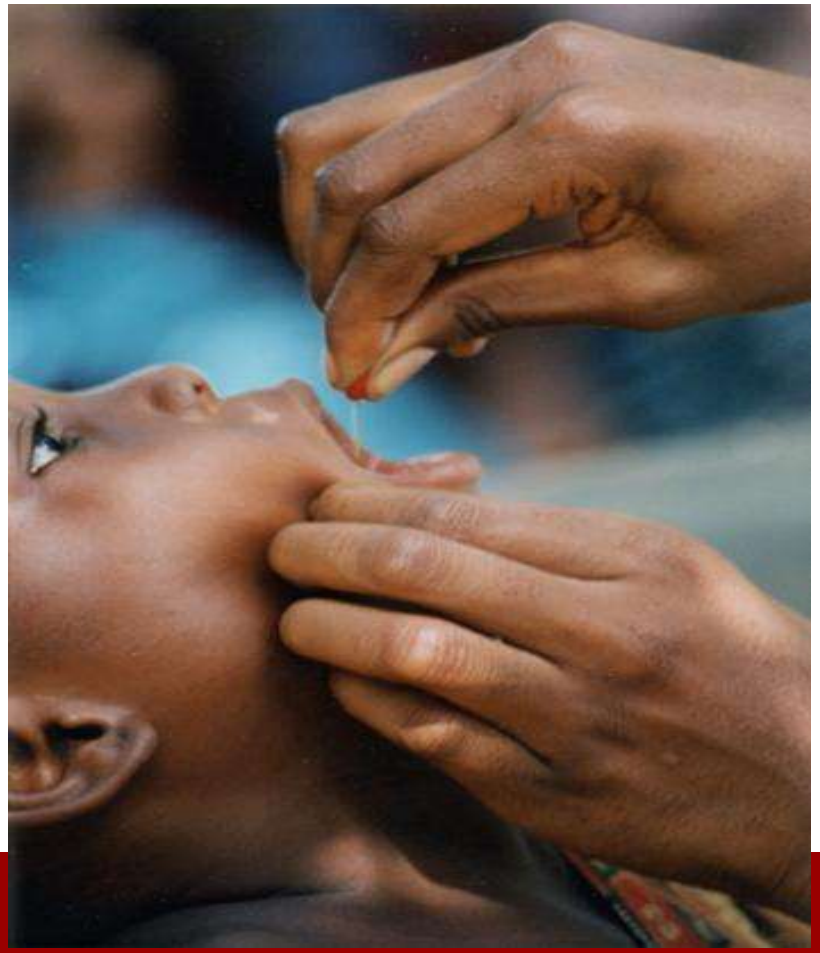
Supplementation

Oral supplements in capsule, tablet or syrup provide immediate relief to vulnerable populations

Vitamin A twice a year for children under 5 (up to 35% mortality reduction in endemic populations)

Iron, folic acid, zinc daily

Iodine once every 6 months - year



Micronutrient Initiative

Fortification of Foods with Vitamins and Minerals *contd*

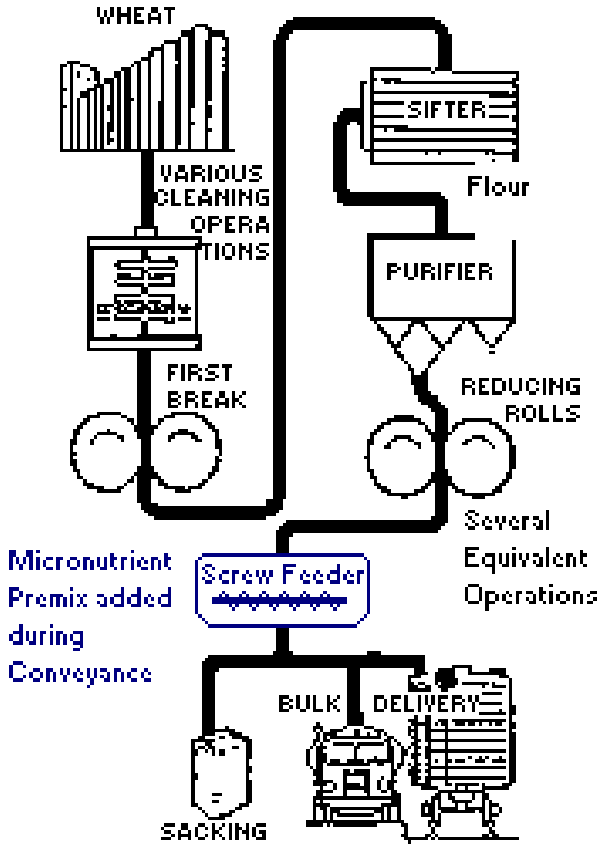
The sustainability of food fortification programmes: country driven rather than agency driven

Past experiences: failure or inefficiencies of fortification programmes were due to the failure to address public concerns and to gain the widest public involvement

Food fortification efforts need to be closely linked with nutrition education programme for the public

Collaboration and coordination among governments, public, scientific and civic institutions, manufacturers and consumer groups

FEASIBILITY OF FLOUR FORTIFICATION



Technology - simple and well established

Extensive experience - 50+ years of history and over 30 countries currently fortify cereal flours

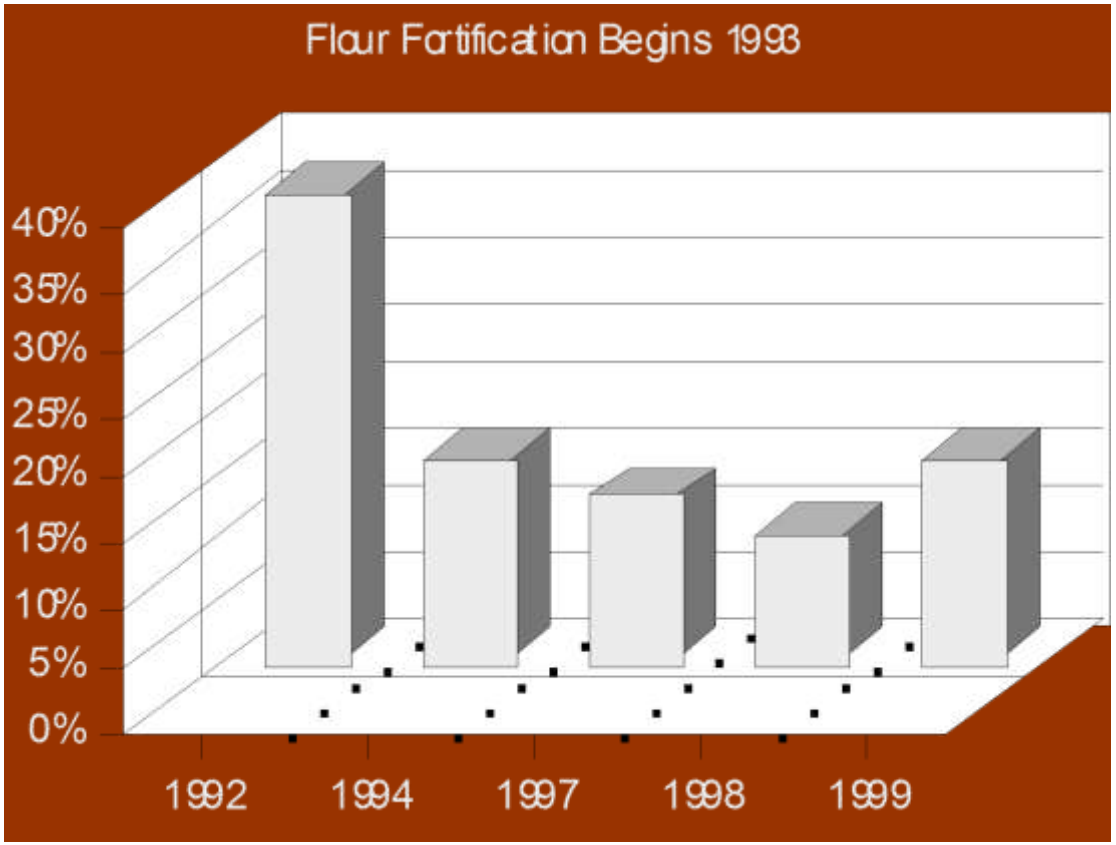
Economical - very cost-effective in providing iron and other nutrients

Food Fortification in Developed Countries

19th – 20th Century	France/USA	Iodine in salt	Control of IDD (Cretinism, mental retardation)
1918	Denmark	Vit A in margarine	Nutritional blindness
1930's	USA	Vit D in milk	Rickets
1940's	USA	Iron & B vits in wheat flour	Beri-beri, pellagra
1980s	USA	Calcium	Osteoporosis (largely market driven)
1998	USA	Folic acid in wheat flour	Neural tube defects

Source: Dr. Omar Dary

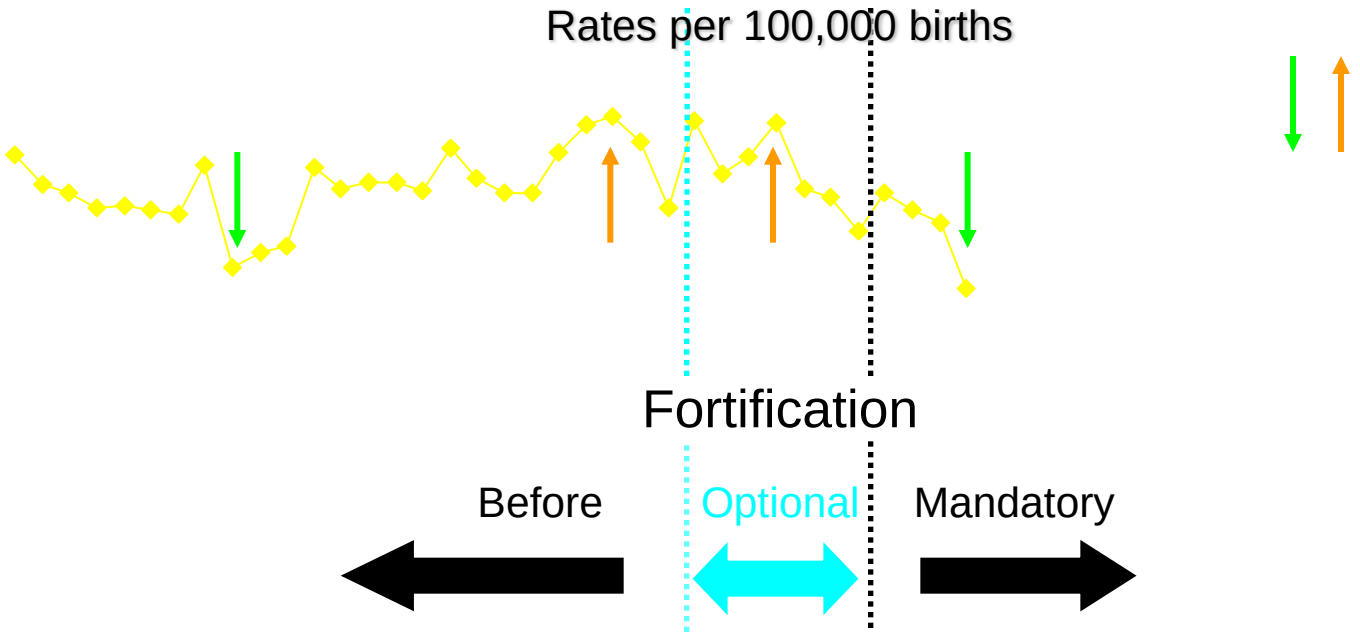
Impact of Venezuelan National Flours Fortification Program: Prevalence of Anemia and Iron Deficiency



Year	Anemia (%)	Iron Deficiency (%)
1992	19	37
1994	9	16
1997	16	13
1998	19	11
1999	17	16

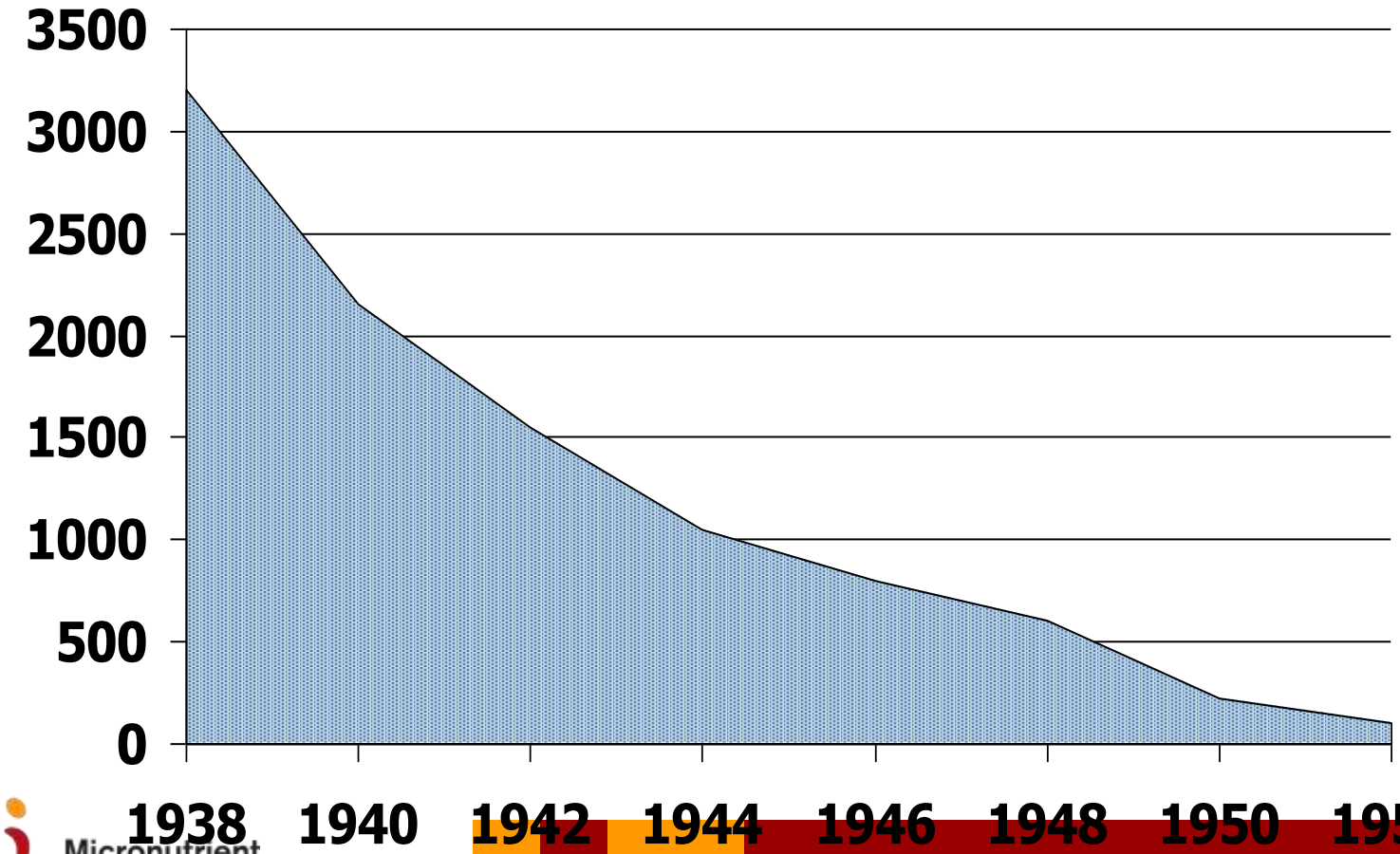
Garcia-Cassal MN. An Venez Nutr v.18 n.1 Caracas 2005

Observed Birth Prevalence Of Spina Bifida In The United States And Food Fortification Status NCHS 1990-1998.

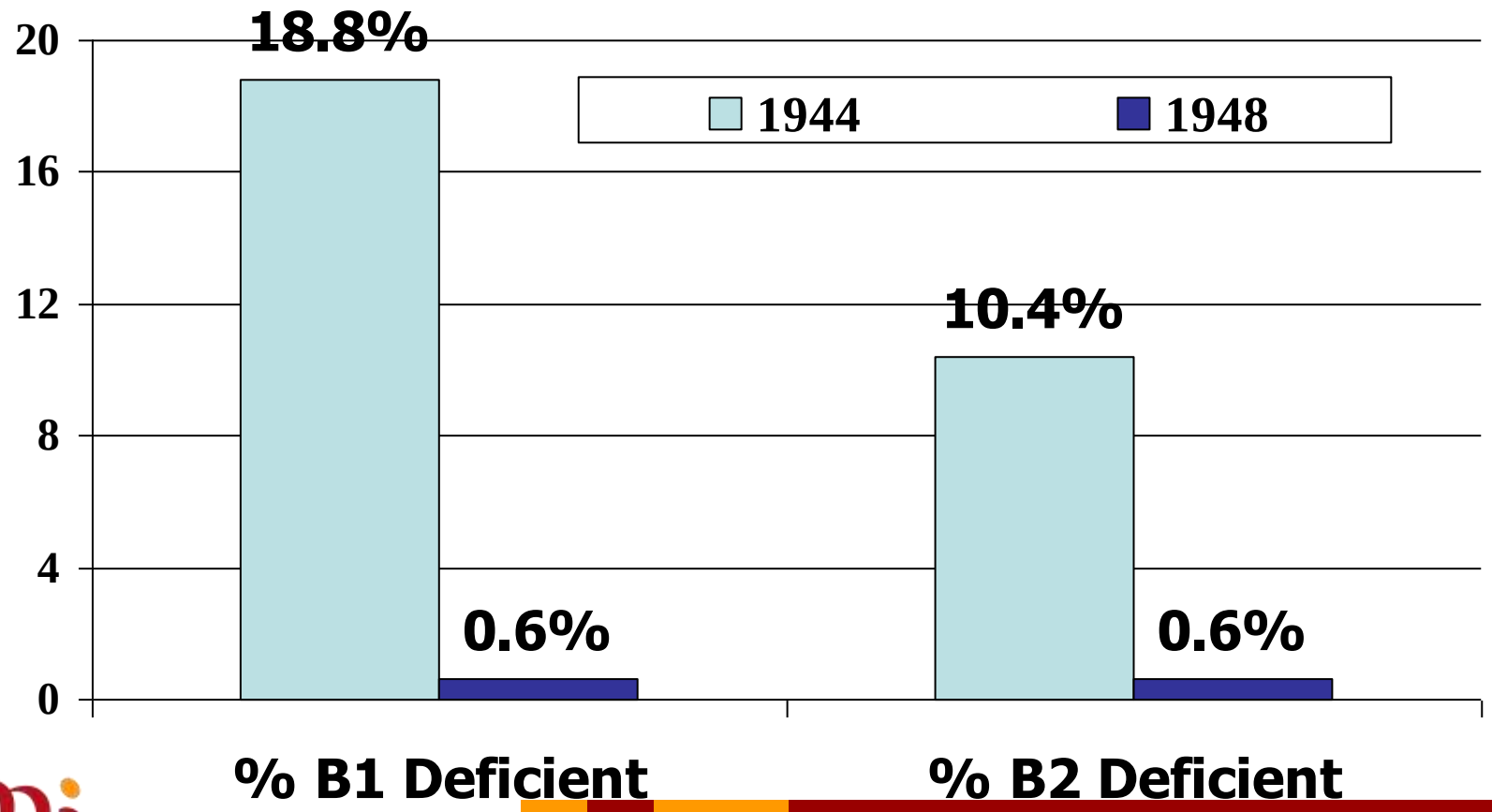


Flour Fortification In USA

Deaths from Niacin Deficiency by Year



Flour Fortification in Canada
Vitamin B Deficiencies



Summary of Implications

Folate: losses in US (birth defects) exceeded $2bn annually (other losses in cvd)

Iodine: worldwide economic losses (prior to salt iodization) could have exceeded $50bn annually

Iron: losses in South Asia alone exceeded $5bn annually

Conclusions

•Small investments in micro-nutrition can enable countries make tremendous achievements in development goals
•We have new technologies, improved communications and infrastructure through supervised feeding programs and through expanding commercial markets.
•International agencies need to provide clear guidelines for immediate application of known solutions, such as flour fortification, for rapid application and scale up
•Governments need to translate their commitment to improve nutrition through strong policy and program support
•The Private sector has an important role in making available the supplements and fortified foods that consumers need
•Through complementary public-private-civic sector initiatives to address nutrition problems we could make an enormous difference to the health and well being of millions around the world.

THANK YOU

Fortification works