



Flour Fortification: Millers and Governments Working Together to Reduce Vitamin and Mineral Deficiencies



Flour Fortification Initiative

A Public-Private-Civic Investment in Each Nation

Annoek van den Wijngaart
10 October 2012

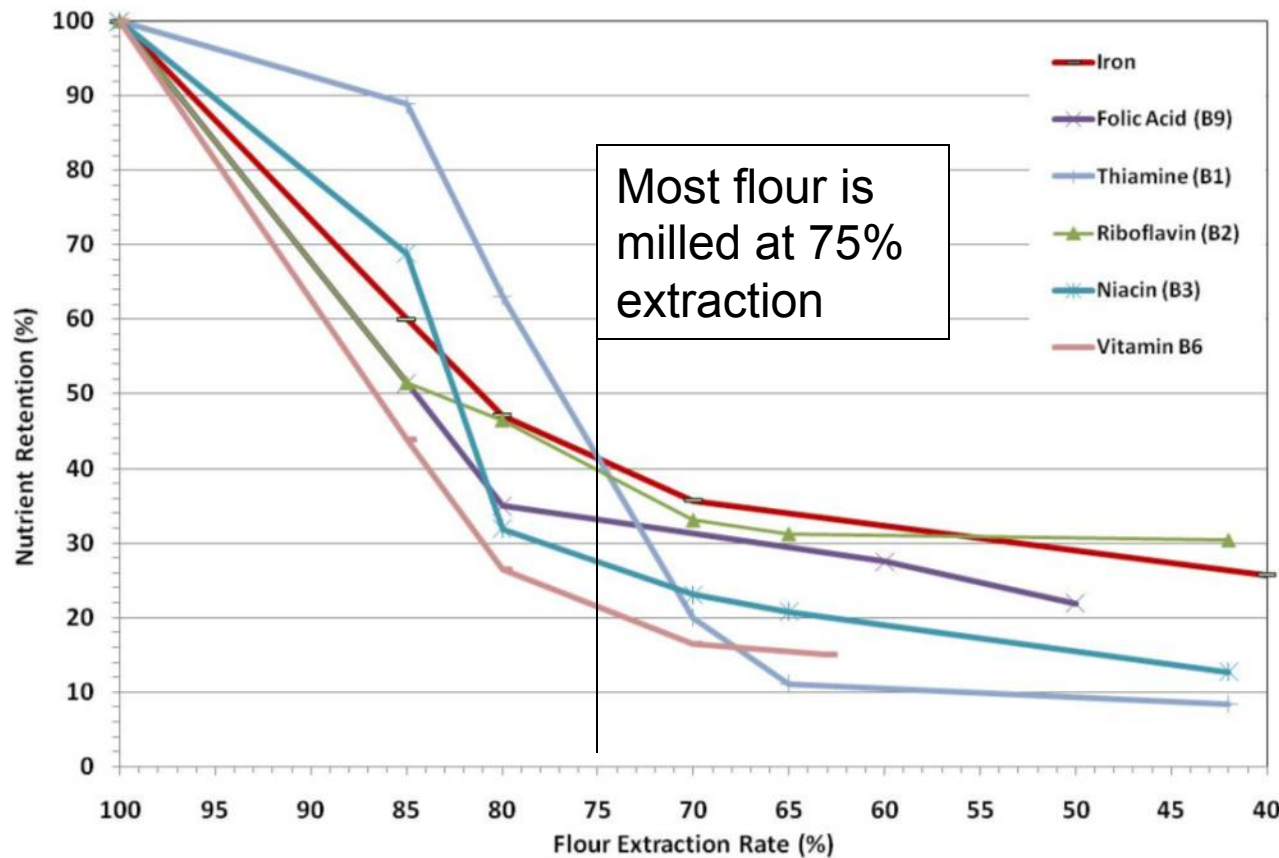
What is Flour Fortification?

Fortification is adding vitamins and minerals to flour during the milling process so that foods made with the flour are more nutritious.



Essential Nutrients Lost in Milling

Wheat and maize lose nutrients in the milling process. Fortification replaces those and can add other vitamins and minerals as needed.



Adapted from "Wheat in Human Nutrition" by W.R. Aykroyd and Joyce Doughty
Food and Agriculture Organization of the United Nations, Rome, 1970.

Burden of Deficiencies

Vitamin and Mineral Deficiencies:

- Impair millions of growing minds and lowers national IQ
- Cause damage to immune systems and deaths of more than a million children a year
- Cause 300,000 serious birth defects annually
- Contribute to the death of approximately 60,000 young women a year during pregnancy and childbirth



Burden of Iron Deficiency



- Reduces work capacity
- Impairs a child's physical and intellectual development
- Contributes to 20% of all maternal deaths



Burden of Anemia

- 17% lower productivity in heavy manual labor
- 5% lower productivity in other manual labor
- Estimated 4% loss of earnings due to lower cognitive skills



Burden of Insufficient Folic Acid

- Leads to neural tube defects (NTDs) such as spina bifida and anencephaly
- Most of these birth defects are preventable; flour fortification will reduce NTD's by 50%
- Cost Benefit Ratio for preventing NTD's: 1:12 (Chile), 1:30 (South Africa) , 1:48 (USA)





FFI Network

FFI is network of partners working together to make flour fortification standard milling practice so that people worldwide are smarter, stronger and healthier.



Annual Financial Partners

CDC, Interflour, Buhler, Bunge, Cargill, GAIN, General Mills, Micronutrient Initiative, UNICEF

Special Purpose Funding

- Smarter Futures
- CDC Birth Defects

Contributors to Special Events

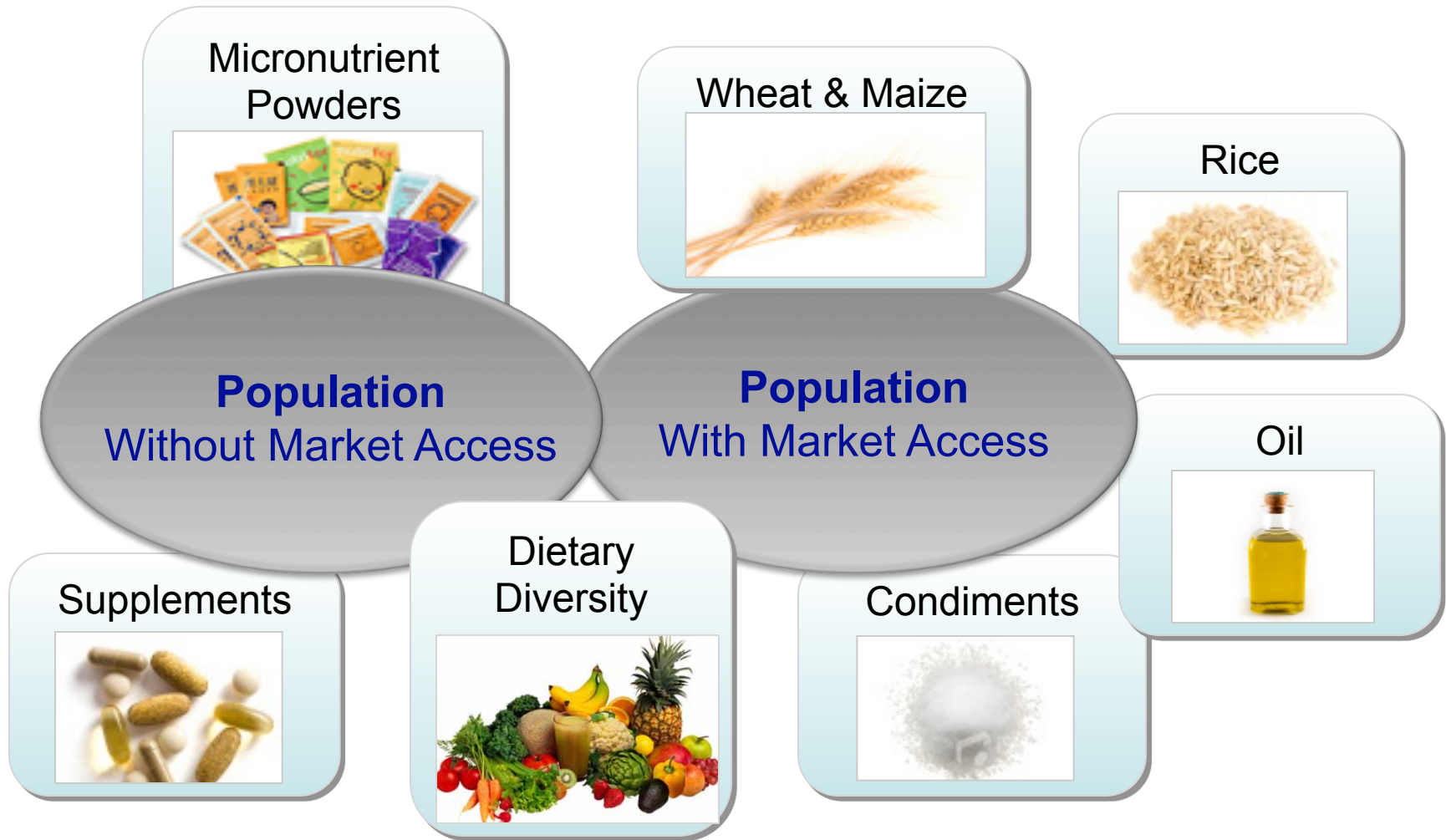
- Hexagon
- Stern Ingredients
- Fortitech
- DSM
- IMP
- Other industry partners

In-Kind and Country Specific Support

- Emory University
- GAIN
- UNICEF
- HKI
- Project Healthy Children
- World Bank
- WHO
- Many others



Multi-faceted Approach



Impact on Nutrition Security



As food prices go up, consumers often stop buying as many meats, fruits and vegetables.



Fortifying flour puts more vitamins and minerals in staple foods which people continue to purchase and consume during economic downturns.



Global Consensus

- Copenhagen Consensus
- World Health Organization recommendations
- UNICEF

The World Health Organization logo, featuring a caduceus (a staff with two snakes) inside a laurel wreath, with the text 'World Health Organization' to the right.

**Recommendations on Wheat and Maize Flour Fortification
Meeting Report: Interim Consensus Statement**

PURPOSE

This statement is based on scientific reviews prepared for a Flour Fortification Initiative (FFI) technical workshop held in Stone Mountain, GA, USA in 2008 where various organizations actively engaged in the prevention and control of vitamin and mineral deficiencies and various other relevant stakeholders met and discussed specific practical recommendations to guide flour fortification efforts being implemented in various countries by the public, private and civic

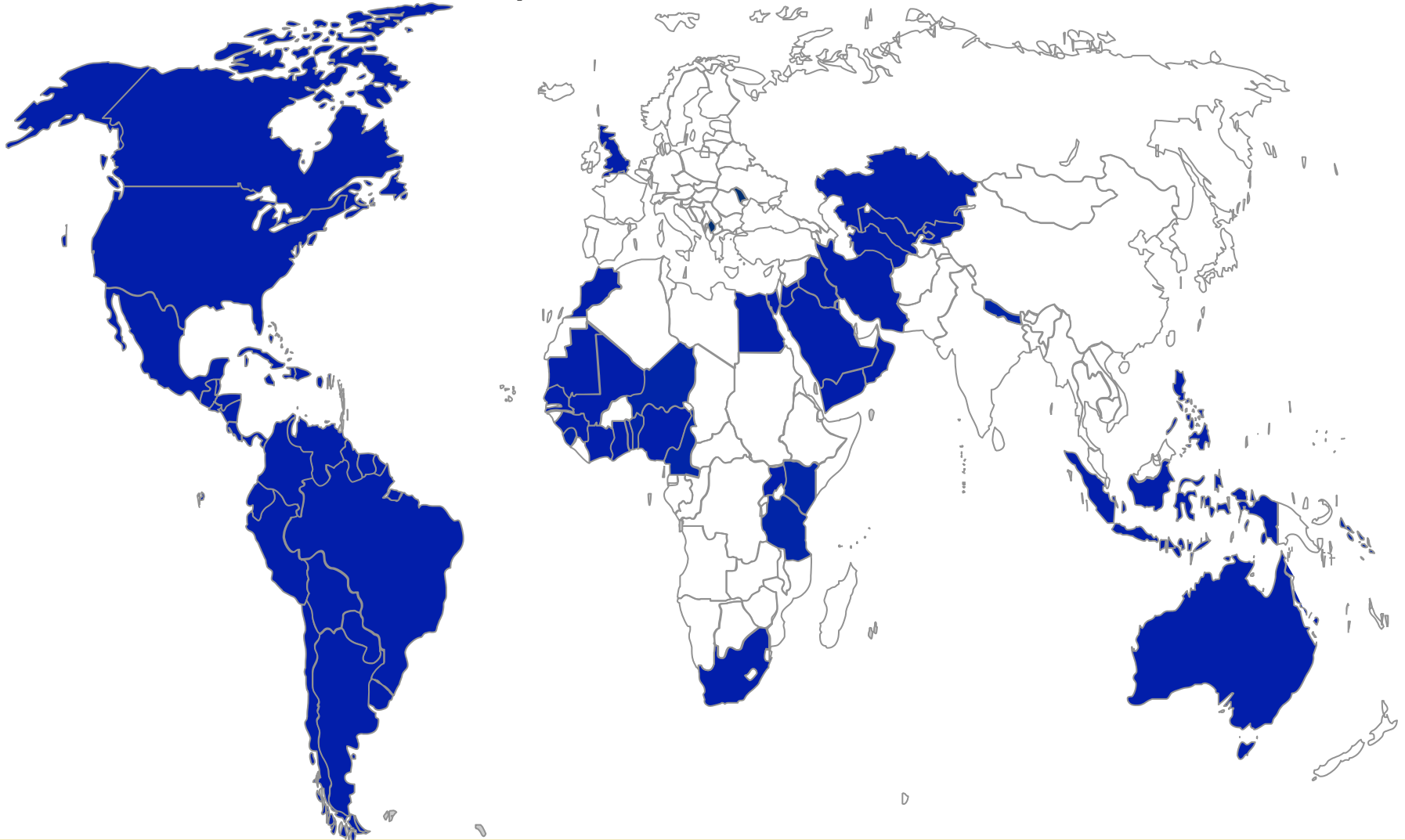
THE FFI SECOND TECHNICAL WORKSHOP ON WHEAT FLOUR FORTIFICATION

Nearly 100 leading nutrition, pharmaceutical and cereal scientists and milling experts from the public and private sectors from around the world met on March 30 to April 3, 2008 in Stone Mountain, GA, USA to provide advice for countries considering national wheat and/or maize flour fortification. This Second Technical Workshop on Wheat Flour Fortification: Practical Recommendations for National Implementation was a follow-up to the FFI, the UN Center for Disease



Wheat Flour Fortification Legislation

October 2012: 75 countries require iron and/or folic acid in wheat flour



All countries fortify flour with at least iron and folic acid except Australia which does not include iron, and Venezuela, the United Kingdom, the Philippines, and Trinidad and Tobago which do not include folic acid.

Flour Fortification Progress

Since 2004:

- ✓ Fortified flour from industrial mills increased from 18% to 30%
- ✓ Number of countries with documented national regulations for mandatory wheat flour fortification increased from 33 to 75.

The combined population of these 75 countries is 2.09 billion



Cost to Fortify



One metric ton of flour is about 2,200 pounds, as pictured here.

Recurring costs of buying quality premix with iron, folic acid and other B vitamins is between US \$1.50-3 per metric ton of flour.

The per person, per year cost to fortify wheat flour may be as little as eight to ten cents.



Global Best Practices

To plan a flour fortification program, consider:

- Local culture and cereal consumption
- Nutritional needs/health burden
- Industry analysis
- Creation of a multi-sector national fortification alliance
- Legislation:
 - make fortification mandatory
 - include fortification in the QA/QC processes
 - adopt an industry standard



Reasons for Mandatory Legislation

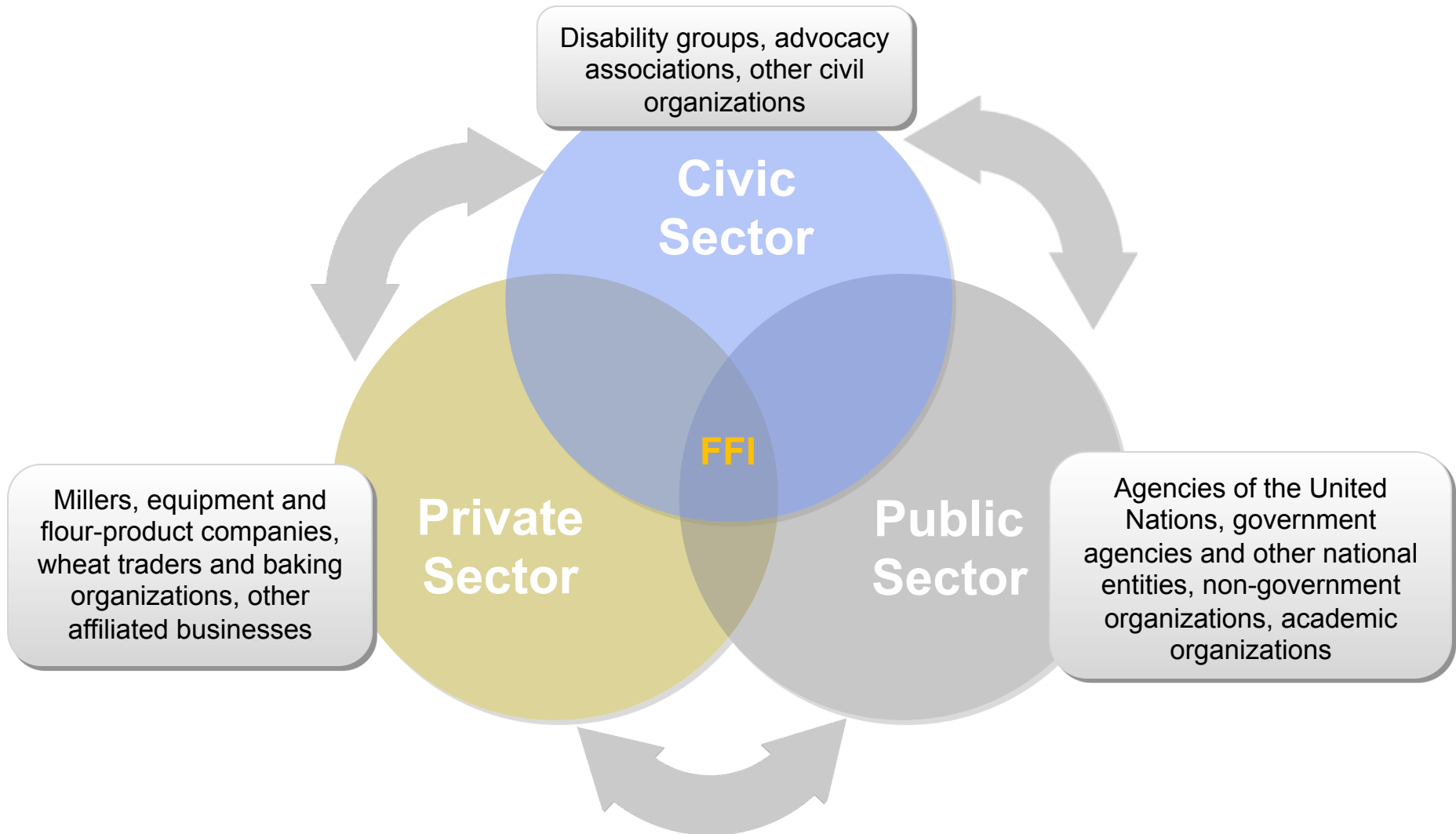
- Equalizes costs for millers
- Sets appropriate standards
 - Best iron compound
 - Levels of other vitamins and minerals
- Can be more easily monitored
- Provides more equitable access to foods made with fortified flour
- Reduces need for expensive marketing campaigns



FFI photo



FFI Stimulates Network Interaction



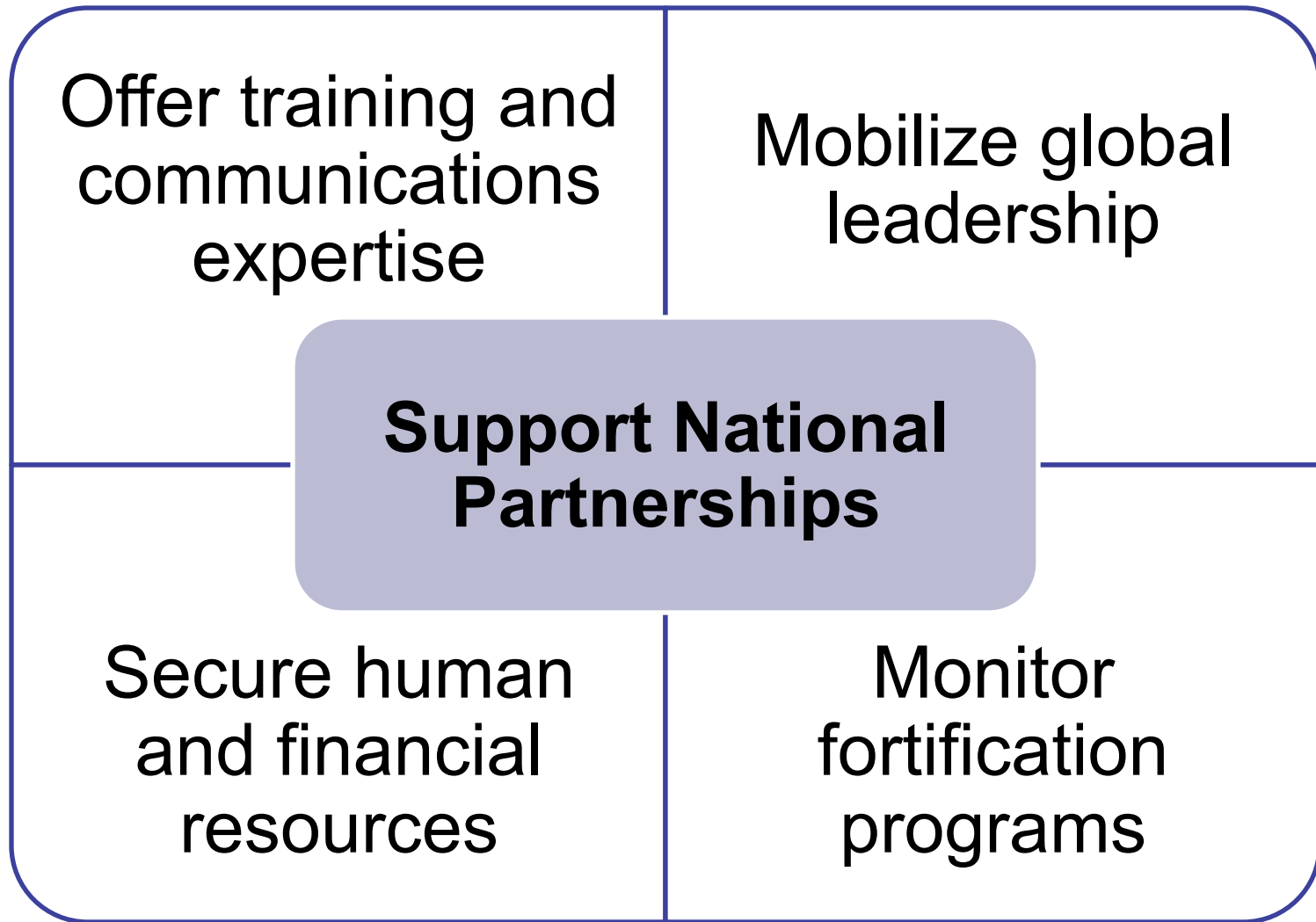
Focus On National Partnerships



- Flour fortification is most successful when it is driven by national leaders.
- Multiple sectors must work together.
- Success of flour fortification in one country can have an accelerating influence in the region.
- A national standard approach is the most effective way forward.
- Reaching the top decision makers is essential.



FFI' s Five Strategies



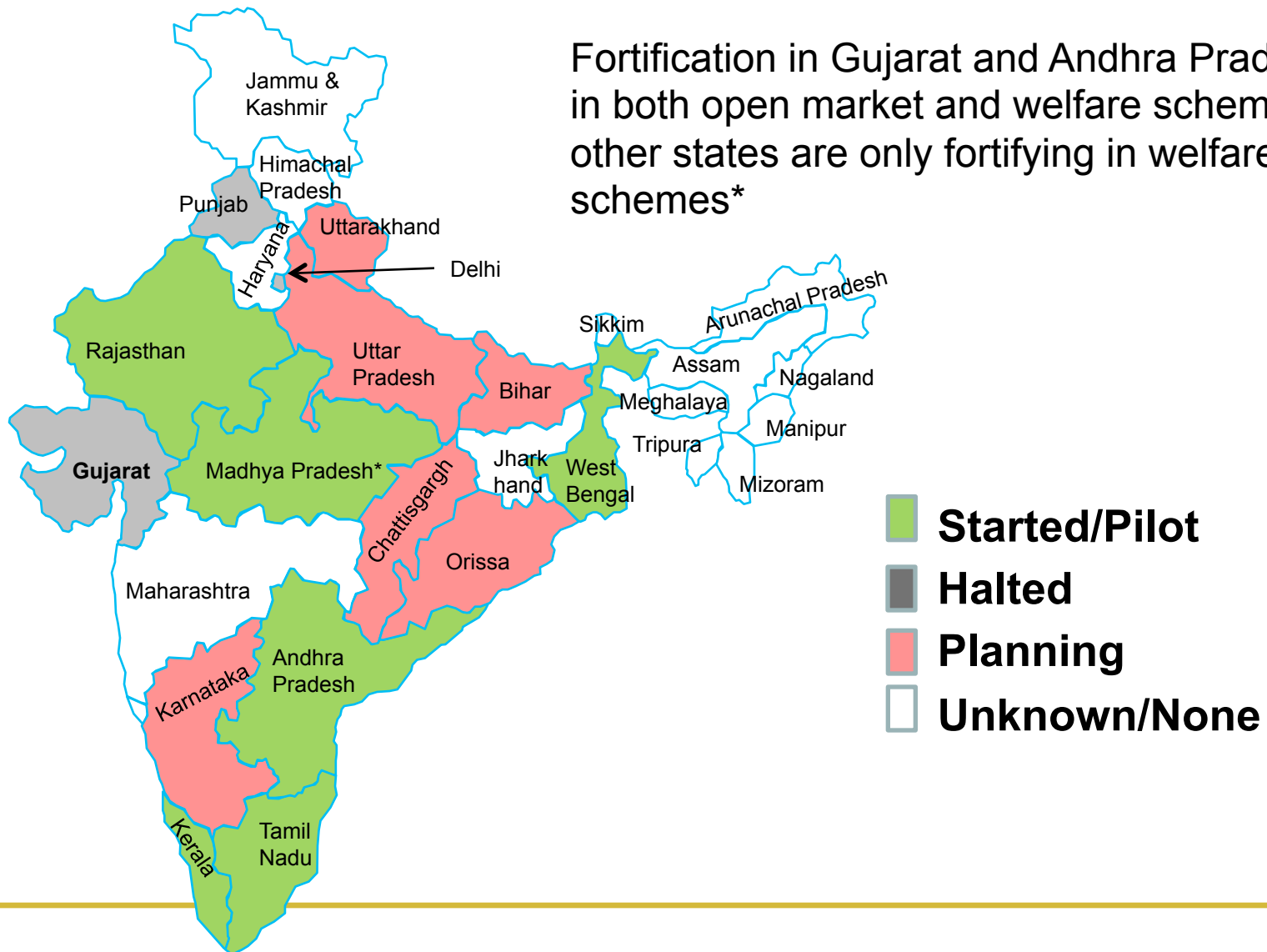
Current activities in Asia

- Indonesia and Philippines: mandatory fortification for many years. Also in Fiji and Solomon Islands
- Nepal announced mandatory flour fortification last year.
- Mongolia and Malaysia drafting legislation
- PNG started working on mandatory fortification
- FFI started talking to stakeholders in Bangladesh and Cambodia
- In Vietnam, Sri Lanka and China discussions are ongoing
- And in India.....



India Wheat Fortification Activity

Fortification in Gujarat and Andhra Pradesh is in both open market and welfare schemes; other states are only fortifying in welfare schemes*



Fortified Wheat Flour Program in Delhi

- Govt. of Delhi in collaboration with city flour mills and IFFN launched fortified flour on 11 Sept. 2012 for 50 million poor and middle class populations in Delhi capital
- 10 kg. fortified flour is sold at US \$3, less than 2 US\$ in the market



Materials

- www.ffinetwork.org
- WHO recommendations
- Food studies report
- Flour Millers' toolkit


World Health Organization

Recommendations on Wheat and Maize Flour Fortification Meeting Report: Interim Consensus Statement

PURPOSE

This statement is based on scientific reviews prepared for a Flour Fortification Initiative (FFI) technical workshop held in Stone Mountain, GA, USA, in 2008 where various organizations actively engaged in the prevention and control of vitamin and mineral deficiencies and malnutrition (referred to as stakeholders) met and discussed specific, practical recommendations to guide flour fortification efforts being implemented in various countries by the public, private and civic sectors. The joint statement reflects the position of the World Health Organization (WHO), Food and Agriculture Organization of the United Nations (FAO), The United Nations Children's Fund (UNICEF), Global Alliance for Improved Nutrition (GAIN), The Micronutrient Initiative (MI) and CI, in a broad range of public health interventions including food industry, scientists and governments involved in the design and implementation of flour fortification programs as public health interventions.

BACKGROUND

WHO and FAO published in 2006 the guidelines on Food Fortification with Micronutrients (WHO/FAO, 2006). These general guidelines, written from a nutrition and public health perspective are intended for governments and agencies implementing or considering food fortification and a source of information for scientists, technologists and the food industry. Some basic principles for effective fortification programs along with fortificants' physical characteristics, selection and use with specific food vehicles are described. Fortification of wheat flour potential to improve the nutritional status, and neither requires change in for compliance. Technological issues need especially with regard to appropriate, suitable ingredients, physical (WHO/FAO, 2006). Worldwide, more than 100 million people are malnourished by iron, zinc, iodine and other fortificants of industrially processed wheat and maize flours. In an effective, step-by-step manner and in line with the WHO/FAO, it is estimated that the population affected is 50% in the Americas, 30% in the South-East Asia, 60% in Europe, and 100% in Africa (WHO/FAO, 2006).

THE FFI SECOND TECHNICAL WORKSHOP ON WHEAT FLOUR FORTIFICATION

Nearly 100 leading nutrition, pharmaceutical and cereal scientists and milling experts from the public and private sectors from around the world met on March 30 to April 3, 2008 in Stone Mountain, GA, USA to provide advice for countries considering national wheat and/or maize flour fortification. This Second Technical Workshop on Wheat Flour Fortification: Practical Recommendations for Wheat Flour Fortification was a follow-up to FFI, the US Centers for Disease Control and Prevention (CDC) and the Mexican Institute of Public Health, first technical workshop entitled "Wheat Flour Fortification: Current Knowledge and Practical Applications," held in Cuernavaca, Mexico in December 2004 (FFI, 2004). The purpose of this second workshop was to provide guidance on national fortification of wheat and maize flours, milled in industrial roller mills (i.e. >20 metric ton/day milling capacity), with iron, zinc, folate, calcium, vitamin B₁, and vitamin A, and to develop guidelines on fortification of premix based on common ranges of flour consumption. A secondary aim was to agree on the best practices guidelines for premix manufacturers and millers. Expert work groups prepared technical documents reviewing published efficacy and effectiveness studies as well as the form and levels of fortificants currently being added to flour in different countries. The full reviews will be published in a supplement of Food and Nutrition Bulletin in 2009 and the summary recommendations of this meeting can be found in http://www.who.int/nutrition/whoworldatworkshop/FFI_2008/.

RECOMMENDATIONS FOR WHEAT AND MAIZE FLOUR FORTIFICATION

Wheat and maize flour fortification is a preventive food-based approach to improve nutritional status of populations over time that can be integrated with other interventions in the efforts to reduce vitamin and mineral deficiencies when identified as public health problems. However, fortification of other appropriate food vehicles with the same and/or other nutrients should also be considered when feasible. Wheat and maize flour fortification should be considered when industrially produced flour is regularly consumed by large population groups in a country. Wheat and maize flour fortification programmes could be expected to be most effective in achieving a public health impact if mandated at the national level and can help achieve international public health goals. Decisions about which nutrients to add and the appropriate amounts to add to flour should be based on a series of factors including the nutritional needs and deficiencies of the population, the usual consumption profile of "fortifiable" flour (i.e. the total estimated amount of flour milled by

Asian Wheat Flour Products:



Impact of flour fortification on organoleptic properties

March 2011





WHY
Fortify?

PLAN
for Fortification

IMPLEMENT
Effectively

MONITOR
for Quality & Impact

COUNTRY
Profiles

REGIONAL
Activity

GLOBAL
Progress

IMPLEMENT Effectively

Toolkit
Premix
Marketing

[Home >>](#) [Implement Effectively >>](#)

Flour Millers' Toolkit

While representatives of the public, private, and civic sectors all have important roles in flour fortification, millers carry out the program's requirements daily. Millers secure materials, equip facilities with proper machinery, and maintain equipment. Flour millers usually cover the costs of these capital investments, and very often they pay the on-going expense of purchasing the vitamins and minerals to add to flour. The millers' costs are frequently passed along to consumers in the form of higher prices, but the additional cost to consumers is as little as 0.01 per five kilograms of flour.

Quality control is the responsibility of both flour millers and external food safety authorities, such as government representatives. See "[Monitoring for Quality and Impact](#)" for guidance on quality control.

Highlights of the Flour Millers' Tool Kit are below. The complete Tool Kit can be downloaded in [English](#), [Arabic](#), [Chinese](#), [French](#), and [Russian](#).

Technical Topics:

- Fortifying flour with vitamins and minerals will not improve flour made with poor quality wheat. If low quality wheat is used, consumers could blame the inferior flour on the fortification and reject all fortified products.
- The most common way to fortify flour is using a micro feeder, also called a dosifier. This adds premix to flour at pre-determined rates in the process of flour production.
- Three types of feeders are available: screw, revolving disk and drum or roller. Screw feeders are the most common. They dispense a set volume of premix at a constant rate. The size of

The Islamic Republic of Iran used a systematic approach to implement flour fortification. See the case study.

[Read more >>](#)

For more information, contact Quentin Johnson, FFI Training and Technical Coordinator, at

quentin@quiccan.com
+1-519-856-2364

Request a free CD of the



In Summary

The Problem:

One-third of the world's population suffers from vitamin and mineral deficiencies. In many countries, both lower and higher income populations are affected –

World Bank 2006

Part of the Solution:

Within countries, FFI stimulates interaction among partners so that together we can achieve results that none of us could achieve independently.



Thank You

