Lessons Learned from Flour and Salt Fortification

Roland Kupka
Senior Adviser Micronutrients
UNICEF New York
rkupka@unicef.org
Outline

• Overview of wheat flour of salt iodization programs
• Criteria of suitable fortification vehicles
• Program success factors
  • Legislation
  • Industry consolidation
  • Partnership and leadership
  • Evidence-based standards
  • Regulation and regulatory monitoring
  • Communication
• Summary
Wheat Availability and Fortification Legislation

* Legislation has the effect of mandating grain fortification with at least iron or folic acid. This does not reflect how much grain is available in that country.

Grain availability data from the Food and Agriculture Organization (2009).
Legislation status from the Food Fortification Initiative (www.FFInetwork.org).
Folic acid fortification of wheat and maize flour reduces neural tube defects

Neural Tube Defects (per 10,000): Pre and Post Fortification with Folic Acid

- Prefortification NTD per 10,000
- Postfortification NTD per 10,000

Brazil, Canada, Chile, Costa Rica, Iran, Jordan, Peru, Saudi Arabia, South Africa, USA

Adapted from FFI 2013. Folic acid in flour ranged from 1.2-2.2 mg/kg.
Globally, three out of four households consume adequately iodized salt.

UNICEF Global Nutrition Database, 2012
National Iodine Status, 2014

http://www.iccidd.org/
Selection of vehicles for fortification

**Suitable Vehicle**
May include cereals (wheat, corn, rice), oils, dairy products, beverages and various condiments such as salt, sauces (e.g. soy sauce) and sugar

- Consumed by large part of population
- Consumed on a regular basis
- Centrally processed
- Premix can be added easily and cheaply

WHO, 2006
Program success factor: Legislation

Mandatory legislation:
Compared to voluntary legislation, it
• provides a higher level of certainty of establishing a sustained source of fortified food
• achieving a public health benefit among target populations

Mandatory legislation promises to achieve greater public health impacts than voluntary fortification

WHO, 2006
Program success factor: Industry consolidation

- India: Industry is getting increasingly consolidated. Gujarat experiencing the largest transition and coverage has correspondingly improved.
- Ethiopia: Small scale primary salt production however consolidation within traders due to remoteness of Afdera contributing to improving HH coverage.
- Ghana: Salt industry has remained fragmented and despite intensive effort by development partners the last 2 decades has not seen a sustained shift in HH coverage.
- China: Highly consolidated and controlled salt industry (High HH coverage maintained).

→ A consolidated salt industry is a key driver of successful salt iodization programs.
Program success factor: Partnership and Leadership

- Consumers
- Government Ministries
- Development Partners
- Academia
- Food Standards Authorities
- Food Industry

National coordination

Government leadership
Committed food industry
Program success factor: Evidence-based standards

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

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES
Issue: Technical Consideration for Rice Fortification in Public Health

Proposing nutrients and nutrient levels for rice fortification

Saskia de Pee¹,²
¹Nutrition Advisory Office, World Food Programme, Rome, Italy; and ²Friedman School of Nutrition Science and Policy, Tufts University, Boston, Massachusetts

Address for correspondence: Saskia de Pee, Office of the Nutrition Advisor, World Food Programme, Via Cesare Giulio Viola 68/70, 00148 Rome, Italy. Saskia.depee@wfp.org

de Pee, 2014
Program success factor: Regulation

Governments are responsible for ensuring that the combination of the food vehicle and the fortificants will be both *efficacious* and *effective* for the target group, yet safe for target and non-target groups.

→ All forms of food fortification should be appropriately regulated

WHO, 2006
Program success factor: Regulatory monitoring (design)

**LEGEND**

- **Industry Monitoring**
- **Government Monitoring**

**REGULATORY MONITORING**

- Vitamin Premix Monitoring
  - Paperwork auditing & occasional lab analysis
- Imported fortified food
  - Paperwork auditing, spot tests & occasional lab analysis

**INTERNAL MONITORING**

- Internal Monitoring (factories & packers)
- External Monitoring (factories & packers)

**EXTERNAL MONITORING**

- Commercial Monitoring (retail stores)
- Coverage Monitoring (household/individual)
- Impact Evaluation (individual)

**COVERAGE & IMPACT MONITORING**

- Quality control & assurance
- Paperwork auditing, factory inspection & product sampling
- Illegal & non-registered products
- Assessment of utilisation & coverage
- Assessment of clinical & functional outcomes

Adapted from WHO/FAO, 2007
Program success factor: Regulatory monitoring (implementation)

Total quality approach:
- Industry documents the process and regulators inspect the records, with product sampling and testing relegated to a validation role
- Fortification quality processes should be nestled within ISO, Good Manufacturing Practice, Hazard Analysis and Critical Control Points (HACCP) guidelines

Punitive measures must be appropriate in the case of repeated non-compliance

Use ‘third party’ testing to put pressure on industry and government
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Use “third party” testing to put pressure on industry and government.

Ensure appropriate resourcing for monitoring and enforcement.
Program success factor: Communication

Voluntary legislation

↑ Awareness
↑ Demand
Influence purchasing behavior

Mandatory legislation

↑ Awareness
- consumers
- policy makers
- regulatory agencies

↓ Misconceptions

Focus on providing consistent messages to target audiences

A universally recognized logo is one tool to identify fortified products
Summary
Lessons Learned from Flour and Salt Fortification

Wheat flour and salt iodization have achieved remarkable public health success worldwide.

Industry consolidation is a key driver of success.

National partnership and long-term industry and government commitment underpin successful programs.

Mandatory legislation, based on evidence-based standards, yields best results but needs to be accompanied by adequate regulatory monitoring.

Communication is important but cannot replace regulatory monitoring in the context of mandatory legislation.