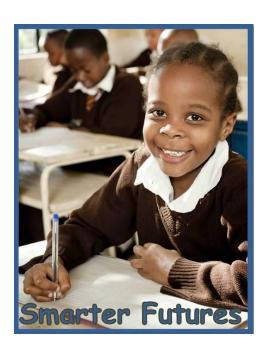
### PREMIX for FORTIFICATION

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# Premix: General Requirements

- Bio-availability of micronutrients
- No change of organoleptic features
- Affordable cost
- Acceptable colour, solubility and particle size
- Commercially available ingredients
- No interaction of active ingredients
- Safety

### Premix considerations

- Definition
- Choice of Fortificant
- Formulation

## Fortificant choice depends upon:

- Identification and Prevalence of Deficiencies
- Consumption pattern of target food
- Single or multiple fortificant
- Bio-availability of micronutrients
- Distribution and storage conditions
- Affordability

### Micronutrients for flour - Minerals

- Minerals (WHO Recommendations)
  - Iron; Ferrous Sulphate, Ferrous Fumarate, NaFeEDTA, Electrolytic
  - Zinc; Zinc Oxide
- Minerals Others
  - Calcium; Calcium Carbonate or Calcium Sulphate
  - Magnesium; Magnesium Sulphate
  - Phosphorus; Calcium Phosphate
  - Selenium; Sodium Selenite

### Micronutrients for Flours – Vitamins

#### Vitamins

- Vitamin A (WHO guideline)
- Folic Acid (WHO guideline)
- Vitamin B1, B2, B3, B5, B6, B12
- Vitamin D
- NOTE: Vitamin C should not be used as a fortificant it reacts with cereal proteins and is destroyed

# Wheat Premix: To meet US/Canada regulations

Used in North American mills

• Ingredient Amount per kg Flour

• Thiamine B1 5.2 mg

• Riboflavin B2 3.6 mg

Niacin B342 mg

• Folic Acid 1.5 mg

• Iron, electrolytic 35 mg

Dosage 160 g per MT flour

# Premixes and Standards North American Example

 Standards in US and Canada set based on Addition and natural levels

| <ul><li>Vitamin</li></ul> | Added | Natural | Total | Standard |
|---------------------------|-------|---------|-------|----------|
| • B1                      | 5.2   | 1.3     | 6.5   | 6.3      |
| • B2                      | 4.0   | 0.4     | 4.4   | 4.0      |
| • B3                      | 46    | 12      | 58    | 52       |
| • FA                      | 1.5   | 0.2     | 1.7   | 1.5      |
| • Iron                    | 38    | 11      | 49    | 44       |

# **Process Losses - Cooking**

- Standards for processed foods made from fortified maize must reflect processing losses
- Main source of losses for maize are during cooking at the household level
- Premixes should contain overages of minerals and vitamins to compensate for processing variations.

# Frequency of procurement

- Depends upon shelf life of premix, usage rate by millers and flour demand
- Premix delivery lead times are about 3-4 months depending upon origin
- Premix shelf life is usually 9 to 18 months depending upon composition – Kosovo premix is simple and will have 12-15 months shelf life
- Sufficient stocks must be in country at mill level to ensure continuation of fortification

# Procurement of Premix – Who is responsible?

- If there is mandatory fortification and flour prices can be adjusted, then millers are responsible for procurement just as they are for buying wheat.
- Key is long term sustainability cannot rely on outside sources of funding for premix
- Options in practice today in other countries: Millers, Millers association, MoH.

### Sources of Premix:

- International Suppliers Europe: CSM, DSM, Eurogerm, Fortitech, Muhlenchemie,
- International Suppliers Americas: Corbion, Granotec, Research Products
- International Suppliers Asia: Hexagon, Nicolas Piramal
- GAIN premix facility suppliers www.gpf.gainhealth.org

NOTE: Smarter Futures and FFI provide a list of suppliers only. Millers and stakeholders must follow internationally accepted procurement procedures