

WHEAT FLOUR FORTIFICATION EXPERIENCE AND PROCESS IN INDONESIA

by

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Why Food Fortification

Because More than Half of People in Indonesia is suffering from a Hidden Hunger called Micronutrient Deficiency

Micronutrient Deficiency Problem

- ❑ **With 220 million population & GDP below US\$ 1,000/capita, Indonesia faces significant micronutrient deficiency problem**
- ❑ **Iron deficiency is major concern for >50% Indonesian infants, children and women**
- ❑ **Fortification has been selected as one of intervention strategy**

Indonesia : More than 100 million suffering from
Micronutrient Deficiencies (MOH,2003)

Malnutrition	Afflicted Numbers
MACRONUT.DEFICIENCY (PEM-Young Chdrn)	5,014,997
MICRONUT.DEFICIENCY :	
• Iron Def.Anemia (IDA) – all ages	100,286,688
• Iodine Def.Disorders (IDD) – all ages	73,643,126
• Vitamin A Deficiency (VAD) – young children	9,026,825
• Vitamin A Deficiency (VAD) – women rep.age	1,023,748
• Others (Def.Zn, Folic Acid,Ca, Vit.B1,Vit.C)	No National Data

Ditzi,DepKes, 2003

COMMITMENT TO FORTIFY FOODS IN INDONESIA

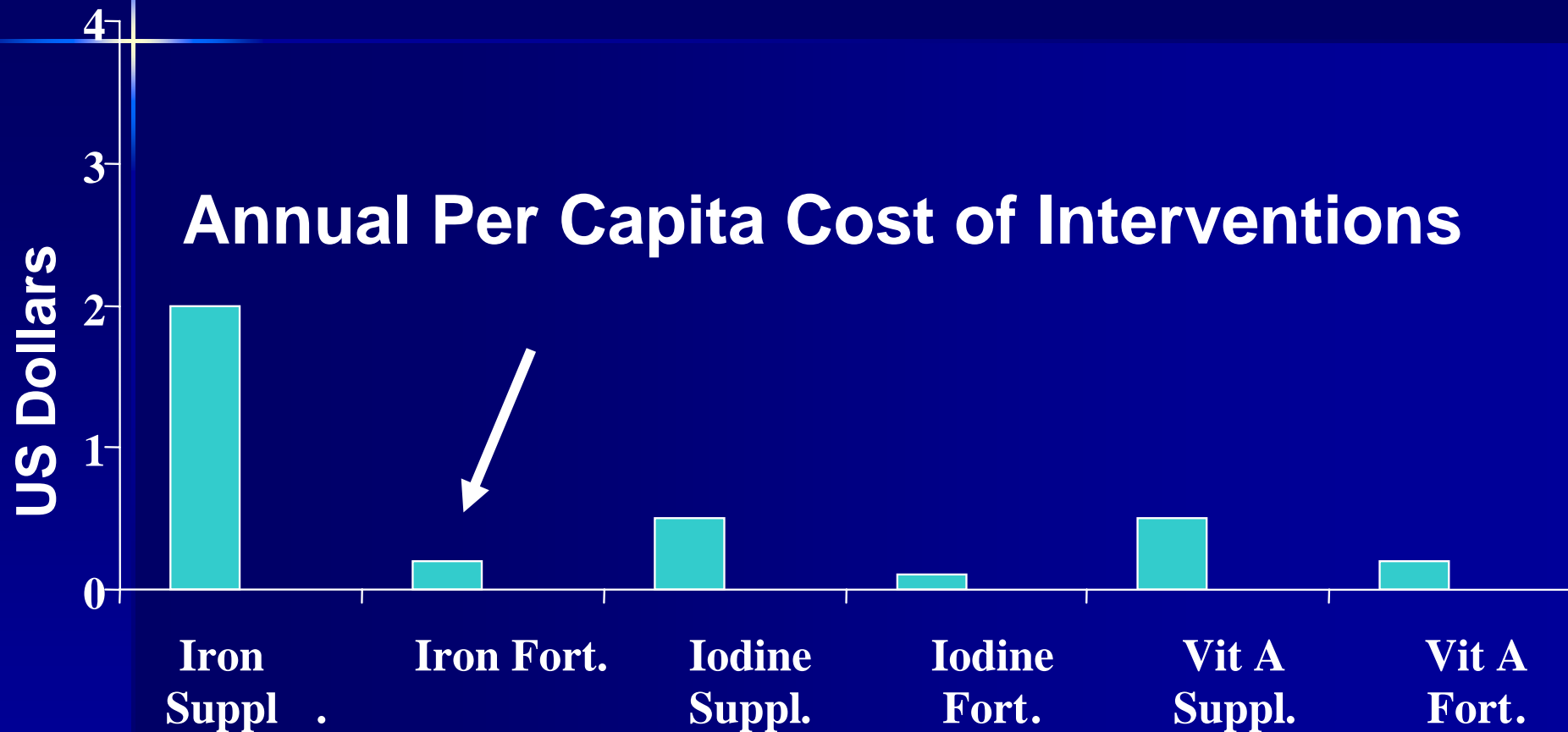
BEGAN

In the Third FIVE YEAR DEVELOPMENT PLAN
(1978)

WHY ?

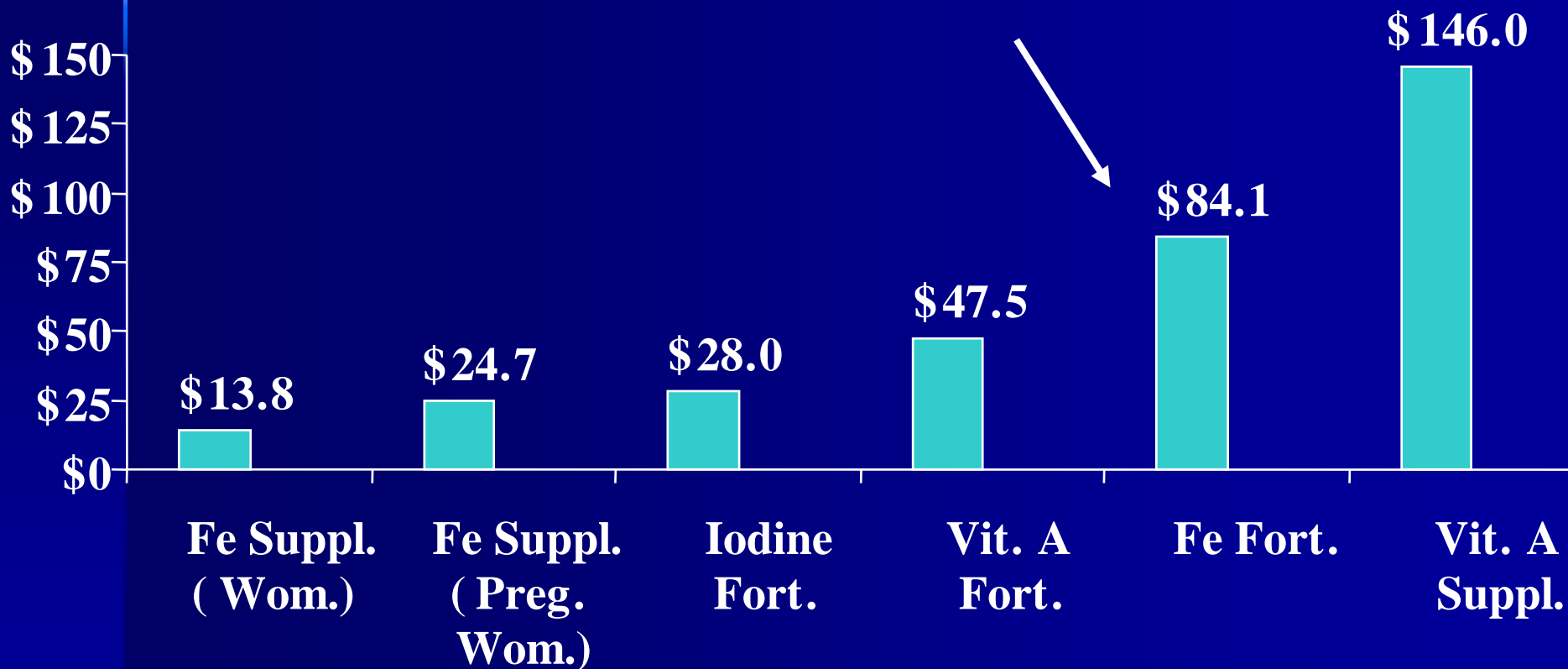
Iron Fortification

Low Cost Solutions to Eliminate Micronutrient Malnutrition



Relative Cost Effectiveness of Micronutrient Interventions

Productivity Gained per US\$ Expended



National Food Fortification Strategy

Salt Iodiation

More than 90% of the Indonesian households consume adequate iodized salt by 2010.

Iron Fortification (Wheat Flour)

More than 90% of the Indonesian's households, consume iron-fortified wheat flour in accordance with established standard by 2015.

New Vehicles For Iron Fortification

- Rice for the Poor, a special poverty program called (RASKIN – Beras untuk Orang Miskin), will be initiated by 2008.
- Sprinkles- for complementary food for under-five children, being developed starting 2007
- Biofortification – new variety of rice that rich in iron with high bioavailability – being studied in several countries including

Indonesia

Why Wheat

- Wheat consumption is predicted to increase from 15 kg/ cap to 30 kg/ cap in 10 years (KFI Report 2004)
- Meets Criteria for Fortification

Flour Mills in Indonesia (2006)

1. Bogasari Flour Mills

Est. in 1971, the largest flour mills in the world. The company has two factories located in Jakarta & Surabaya.

Capacity : 2.3 mio of flour p.a. [Jakarta]

: 1.3 mio of flour p.a. [Surabaya]

Estimated market share : 67%

2. Eastern Pearl FM

Est. in 1973, the factory is located in Makassar.

Capacity : 0.64 million of flour p.a. Estimated market share : 12%

3. Panganmas Inti Persada FM

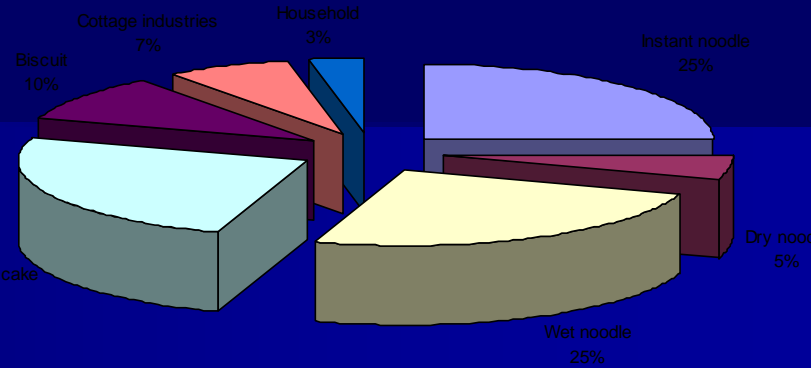
Est. in 1997, the factory is located in Cilacap.

Capacity : 0.22 million of flour p.a. Estimated market share : 4%

4. Sriboga Raturaya FM

Est. in 1998, the factory is located in Semarang.

Capacity : 0.33 million of flour p.a. Estimated market share : 4%



Nutrient Deficiency Problem in Indonesia

- Iodine deficiency disorder
- Iron deficiency anemia
- Vit A deficiency
- Calory and protein deficiency

Steps in Fortifying Flour

- Review the need of fortification program.
- Conduct trial of fortificants: milling techniques and end products effects.
- Choose the best fortificants based on the above experiment and commercial considerations.
- Prepare the necessary regulations, both local (government) and international (WTO). To be effective fortification must be mandatory.
- Inform customers and other stakeholders.

Conclusion of Premix Testing

- Premix containing elemental iron, zinc, B1, B2 and folic acid accepted at 40, 60 ppm Fe.
 - *At 80 ppm Fe, bitter after taste in noodle appears*
- Premix containing ferrous sulfate rejected because of dark color and bitter after taste in noodle after cooking

Element	<u>EI 100</u>	<u>EI 150</u>	<u>EI 200</u>	<u>FS100</u>	<u>FS150</u>	<u>FS200</u>
<input type="checkbox"/> IRON	40	60	80	20	30	40
<input type="checkbox"/> ZINC	20	30	40	20	30	40
<input type="checkbox"/> THIAMIN	1.7	2.5	3.3	1.7	2.5	3.3
<input type="checkbox"/> RIBOFLAVIN	2.7	4.0	5.3	2.7	4.0	5.3
<input type="checkbox"/> FOLIC ACID	1.3	2.0	2.7	1.3	2.0	2.7
<input type="checkbox"/> RESULT	✓	✓	X	X	X	X

Indonesian Wheat Flour Fortification Standard

- Fe min 50 ppm
- Zn min 30 ppm
- Thiamine min 2.5 ppm
- Riboflavin min 4 ppm
- Folic acid min 2 ppm

Historical Milestones

- 1980s First effort to fortify flour through academics approach
- 1998 Talk between USAID, Unicef and MOH on the incoming iron fortificant donation
- June 1998 MOH decree on wheat flour fortification
- 1998 Scientific trial on the effect of fortificant on wheat flour and its end products; fortificant (iron) donation from USAID received
- Jan 1999 Bogasari Jakarta started flour fortification
- Feb 1999 Bogasari Surabaya started flour fortification
- Sep 1999 All flour mills fortified flour
- 2000 New SNI (Standard Nasional Indonesia) on wheat flour with fortification in place
- 2001 Premix fortificant (5 elements) from CIDA received
- Feb 2002 Ministry Industry and Trade decree on mandatory SNI for all wheat flour traded in Indonesia

Regulations Supporting Mandatory Flour Fortification

- **16 June 1998** **MOH decree no. 632/Menkes/SK/VI/1998**
Wheat flour fortification for all flour produced in Indonesia
- **2000** **SNI 01-3751-2000**
National standar on wheat flour (including fortification standard)
- **2 May 2001** **Min. Industry and Trade decree no. 153/MPP/Kep/5/2001**
Mandatory SNI for all wheat flour traded in Indonesia
- **10 Nov 2001** **Min. Industry and Trade decree no. 322/MPP/Kep/11/2001**
Revision of the above decree to extend implementation of mandatory SNI by another 3 months
- **31 Jan 2002** **Min. Industry and Trade decree no. 59/MPP/Kep/11/2001**
Authorized laboratorium for wheat flour checking
- **1 Feb 2002** **Directorate General Chemical, Agro and Forest Industry decree no 03/DIRJEN-IKAH/SK/II/2002**
Standar operating procedure on mandatory SNI on wheat flour
- **28 March 2002** **Dir. General Customs S672/BC.3/2002**
Flour importation procedure
- **7 July 2003** **MOH decree no. 962/Menkes/SK/X/2003**
Wheat flour fortification for all flour traded in Indonesia including import
- **7 Oct. 2003** **MOH decree no. 1452/Menkes/SK/X/2003**
Wheat flour fortification esp. to revise fortification dosage to be in line with SNI

Fortification Cost

- The fortification cost according to Indonesian standard is about US\$ 0.15¢/kg flour.
- The other costs are capital expenses (dosers), inventory and QC. Most modern mills are already equipped with dosers.

Implementation Problem

Technical

- Effects of fortificants on the end products
 - Riboflavin excess turns noodle yellow
 - Colour problem in exported products
- Homogeneity problem in the mills
 - Expect 30% range from targeted dosage, hence overage
- QC problems*)
 - All mills have process control and quality control in place.
 - Premix was controlled through CoA and physical observation.
 - Dosers were continuously checked
 - End product quality was controlled by process control and chemical test is done twice a year in third party lab.
 - Only one mill did iron spot test
 - This mill also increased fortificant dosing rate 180% above the standard as lab test often showed folic acid content below the targeted level.
- Effectiveness problem
 - Effectiveness of the program must be reviewed after a few years of implementation

Actual fortified flour test result shows variability in fortificant content.

(in ppm)

	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Iron	55.6	60.9	74.2	57.3	71.0
Zn	34.4	37.8	30.8	33.2	40.0
B1	4.40	6.52	6.26	6.56	6.86
B2	4.40	4.07	4.14	4.67	4.85
Folic acid	5.82	5.09	5.92	6.13	5.27

Samples taken in March 07.

This maybe due to:

- Homogeneity in the mills
- Testing errors

Implementation problem

Regulatory

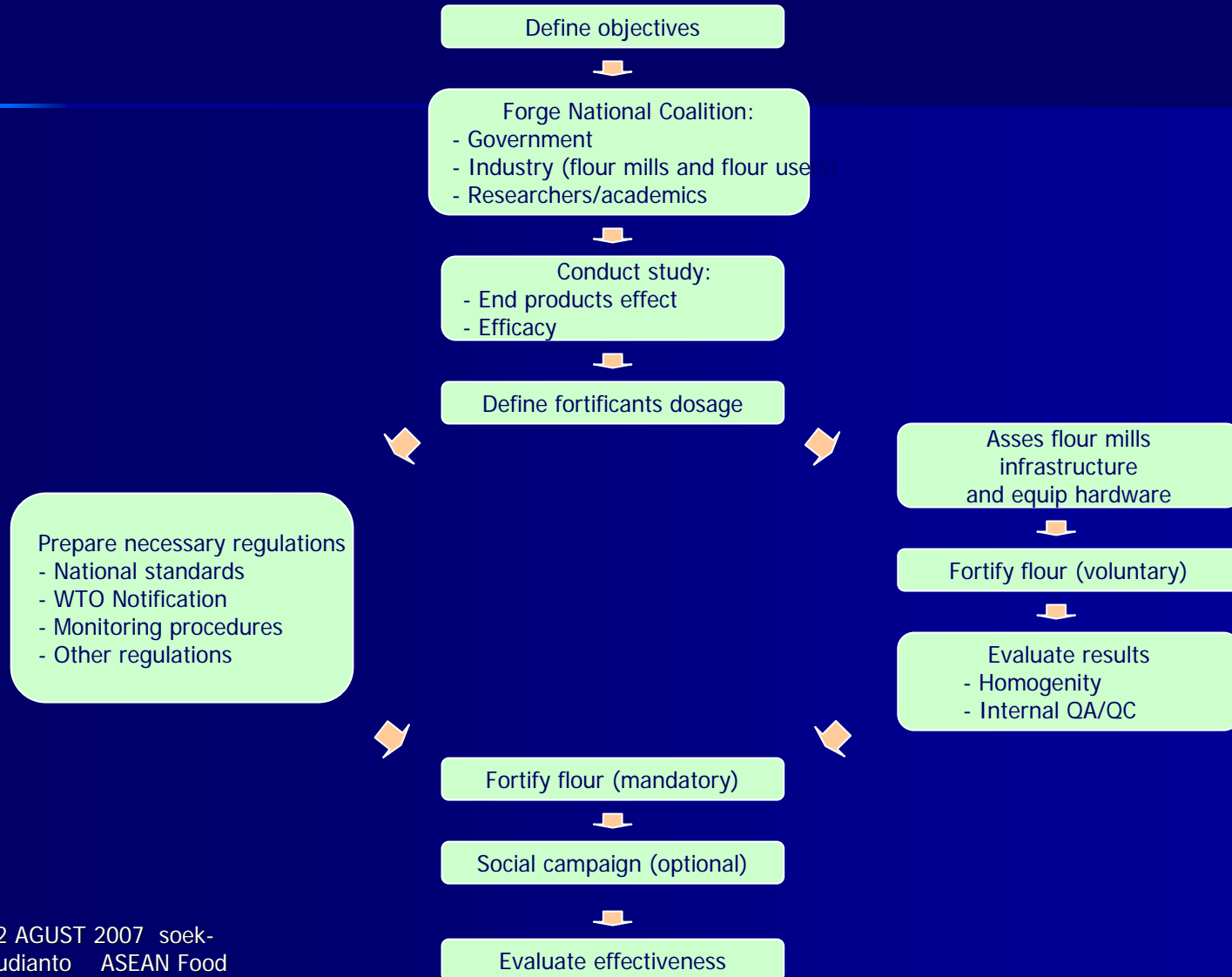
- WTO issues-flour import
 - Question from USA and Australia
- Regulations and alignment among different government bodies: MOH, Ministry of Trade, Ministry of Industry, Customs.
 - Regulations were made according to the needs, not sufficiently prepared
- Monitoring problem
 - Due to budget limitation, monitoring is not done on a regular basis.
 - Only one lab has the capacity to carry out the test of all five fortificants.
 - Custom office relies on CoA issued by exporting countries lab as screening tool.
 - Folic acid analysis procedure in the standard is a bit out of date and may lead to low test result

Implementation Problem

Political

- Political will among shareholders
 - Initial effort to fortify flour failed due to lack of political will
- Fortificants oppositions/skeptics
 - Critics from the user that fortification was to a trade barrier to protect certain local flour mills and its effects were doubtful

Wheat Flour Fortification Guidelines



Key Success Factors

- Political will from all stakeholders (government, industry, academics, civil society)
- Assistance in the beginning phase
- Sufficient regulations to support mandatory fortification
- Economic feasibility
- Continuous support from government, donors and health related NGO's to maintain