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Scaling-Up Rice Fortification Program Through Techno-Transfer: A Strategy Towards Nutrition Security

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Director

Paper presented during the 12th Philippine National Health Research System (PNHRS) Week, CAP-John Hay Trade and Cultural Center, Baguio City, August 7, 2018

Did you know?

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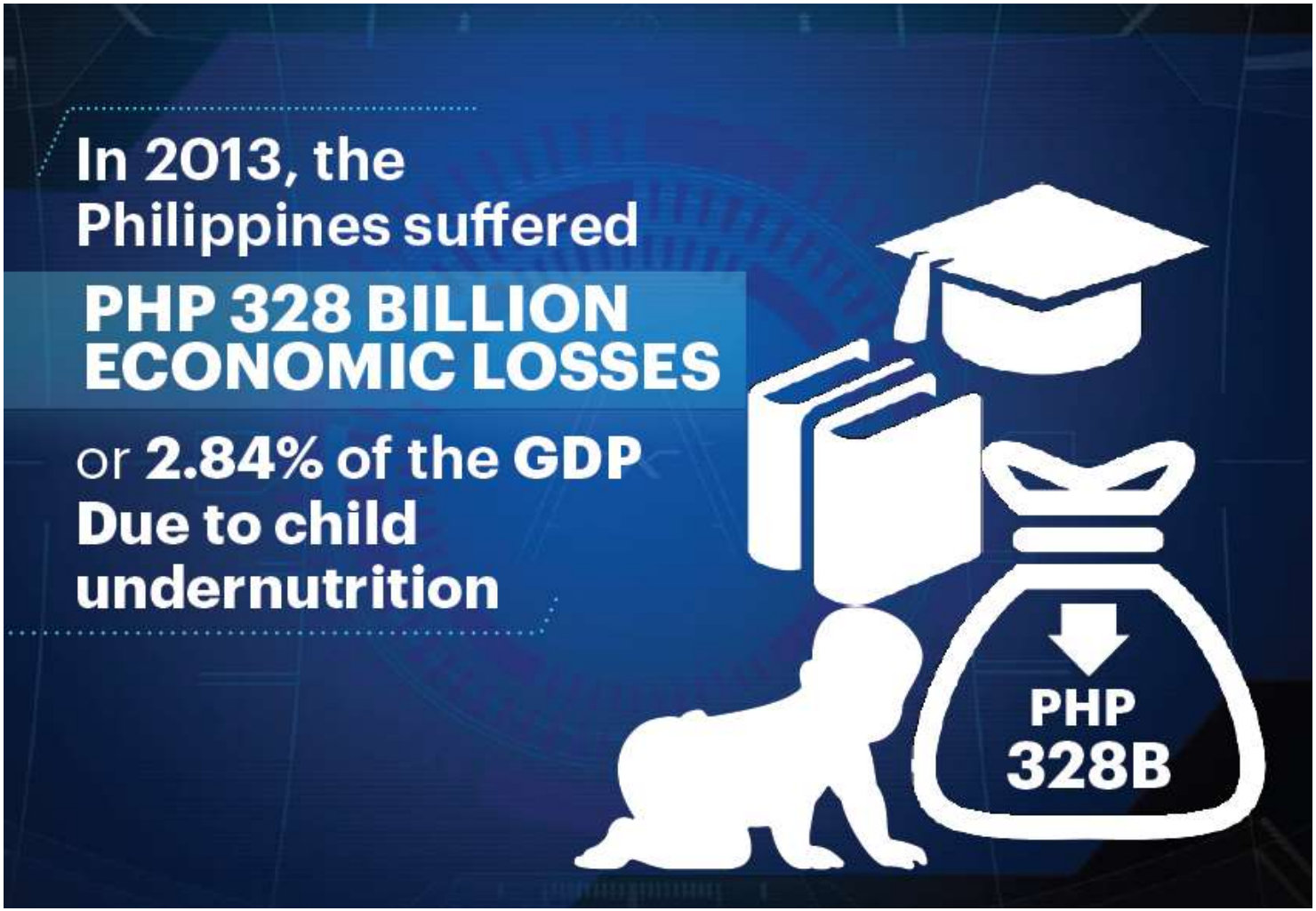

Did you know?

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Do you know that !!!!!!!

Stunting is a largely irreversible outcome of inadequate nutrition, bouts of infection during the FIRST 1,000 DAYS of a child's life.

Source: WHO, Nutrition Global Targets

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Do you know that !!!!!!!!

Stunting or other measures of lost growth potential is associated with reduced grade attainment.

Source: WHO, Nutrition Global Targets

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Do you know that !!!!!!!

Stunting has long-term effects

including:
DIMINISHED COGNITIVE & PHYSICAL DEVELOPMENT, REDUCED PRODUCTIVE CAPACITY and **POOR HEALTH**

Source: WHO, Nutrition Global Targets

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Do you know that !!!!!!!

Reduced school attendance results in diminished earning capacity;

An average of 22% loss of yearly income in adulthood.

In Brazil, a 1.0% increase in height leads to a 2.4% increase in adult male earnings

Source: WHO, Nutrition Global Targets

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Did you know?

The Philippines is losing and will continue to lose around $ 4.5 billion/year **(PhP 238.5 billion/year)** if current rates of undernutrition are not mitigated

In 2015 this loss was equivalent to around 1.5% of the country's GDP

The Economic Consequences of Undernutrition in the Philippines, UNICEF :2018

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Did you know?

Adult productivity deficits caused by childhood **stunting** and **micronutrients deficiencies** entails the greatest loss from undernutrition, which reaches more than **PhP 150 billion every year**

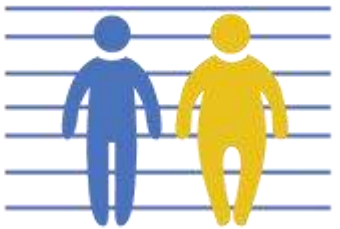
The Economic Consequences of Undernutrition in the Philippines, UNICEF

Malnutrition has many forms

CHILD STUNTING
Low height for age

CHILD WASTING
Low weight for height

CHILD OVERWEIGHT
High weight for height



ADULT OVERWEIGHT
Carrying excess body fat with a body mass index ≥ 25

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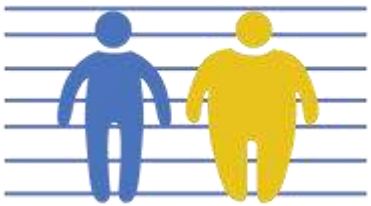
Malnutrition has many forms

Fe

MICRONUTRIENT DEFICIENCY
iron, folic Acid, vitamin A, zink, iodine below healthy thresholds

NONCOMMUNICABLE DISEASES
Diabetes, heart diesease, and some cancers



ADULT OBESITY
Carrying excess body fat with a body mass index ≥ 30

Source: Global Nutrition Report 2016

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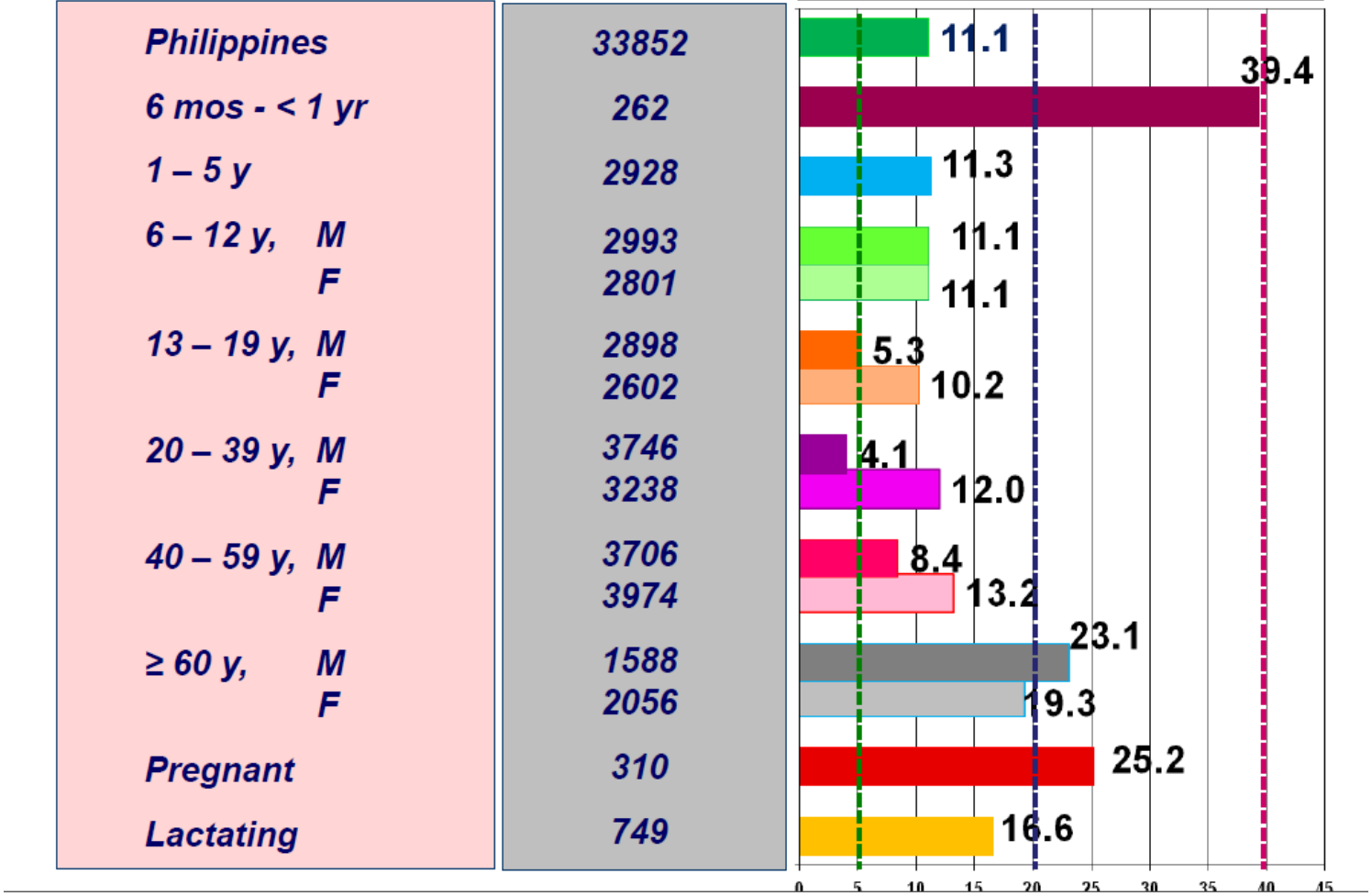
Did you know?

Prevalence of anemia by age, sex and physiologic state, 2013

Age/Sex/Physiologic State		No. of Subjects	Prevalence (%)
Philippines		33852	11.1
6 mos - < 1 yr		262	39.4
1 – 5 y		2928	11.3
6 – 12 y,	M	2993	11.1
	F	2801	11.1
13 – 19 y,	M	2898	5.3
	F	2602	10.2
20 – 39 y,	M	3746	4.1
	F	3238	12.0
40 – 59 y,	M	3706	8.4
	F	3974	13.2
≥ 60 y,	M	1588	23.1
	F	2056	19.3
Pregnant		310	25.2
Lactating		749	16.6



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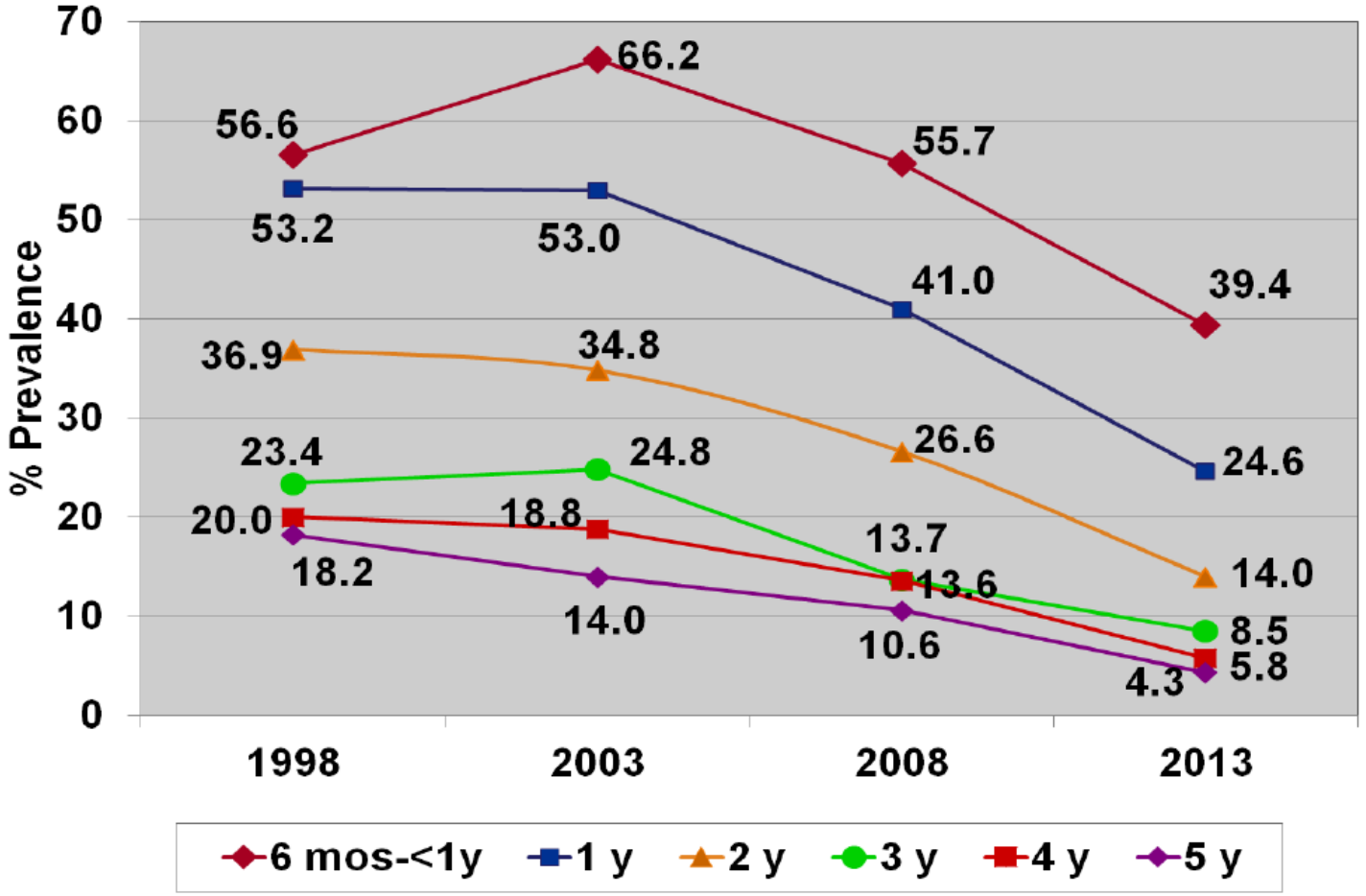
Trends in the prevalence of anemia among children Philippines: 1998, 2003, 2008 and 2013



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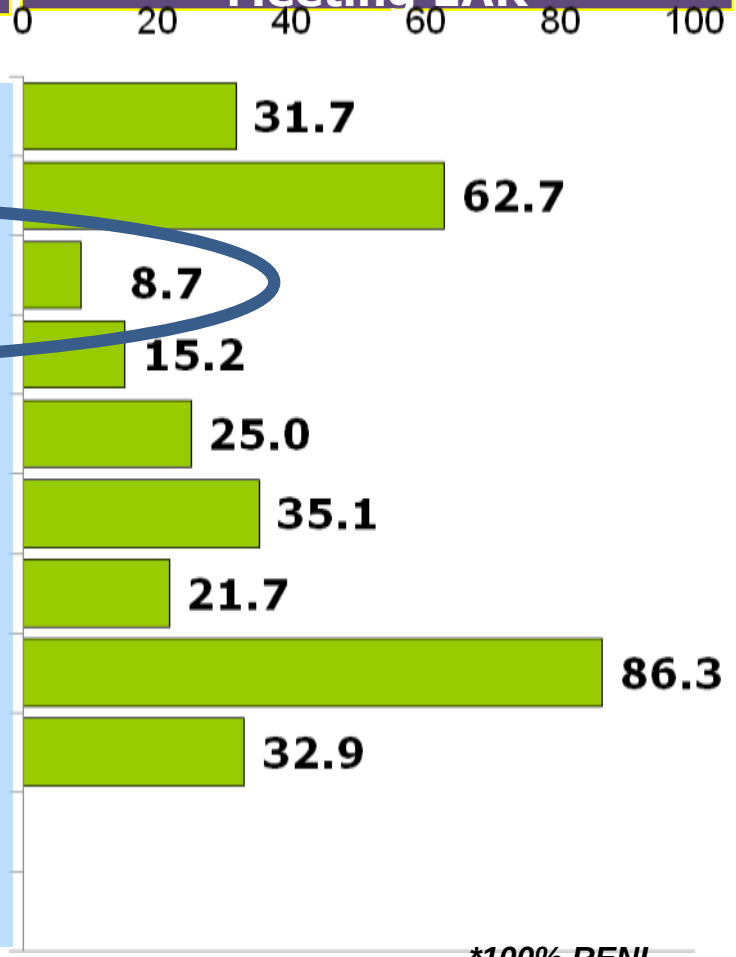
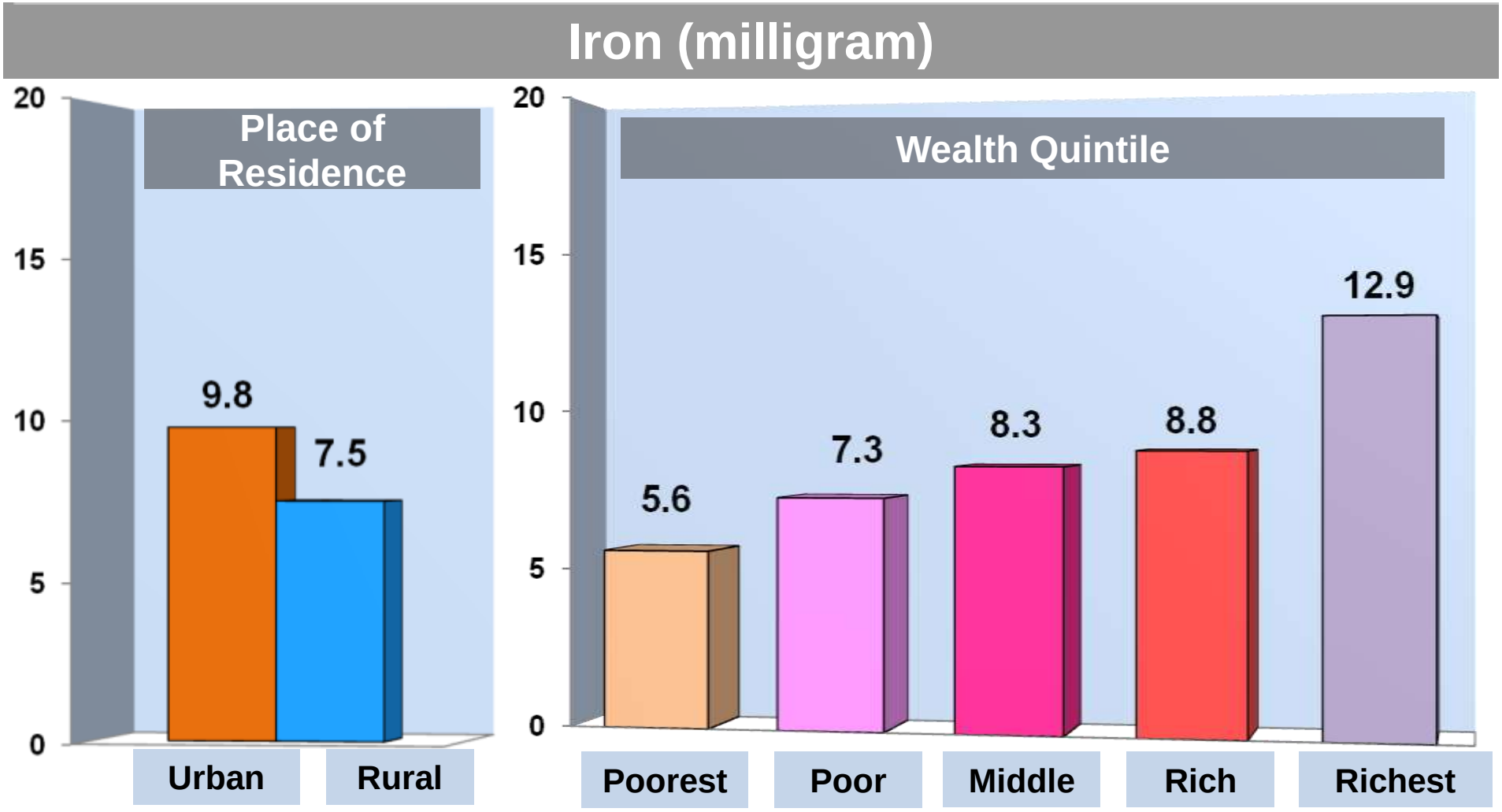
Mean One-Day Per Capita Nutrient Intake and Proportion of Household Meeting EAR : Philippines, 2013

Nutrient	Intake	Proportion of HH Meeting EAR
Energy (kcal)*	1811	31.7
Protein (g)	56.5	62.7
Iron (g)	9.4	8.7
Calcium (g)	0.39	15.2
Retinol Eq. (μg)	532.8	25.0
Thiamin (mg)	0.82	35.1
Riboflavin(mg)	0.76	21.7
Niacin (mg)	18.3	86.3
Ascorbic Acid (mg)	43.8	32.9
Fats (g)	38	
Carbohydrates (g)	310	



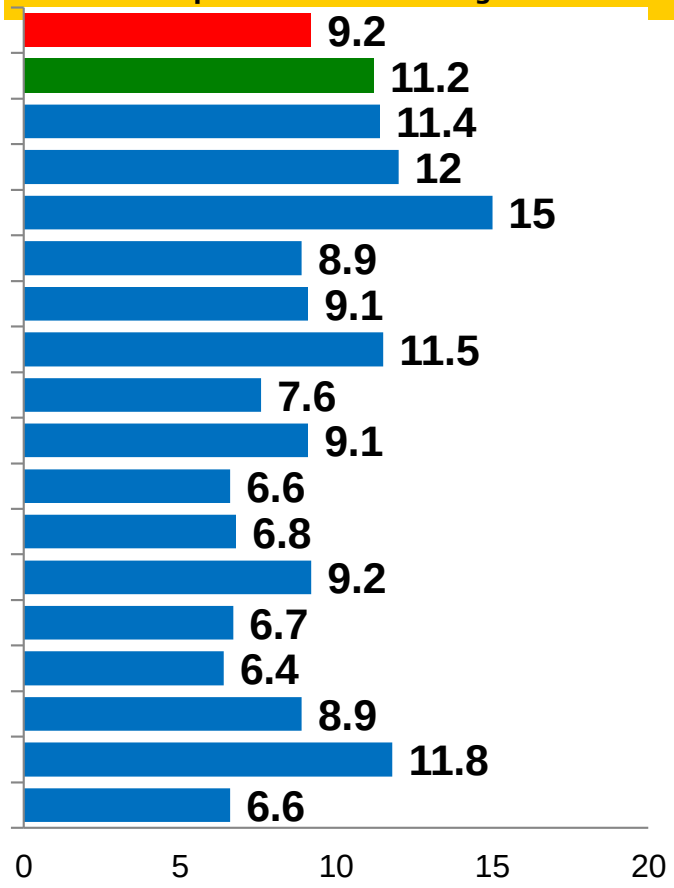
*100% RENI

Proportion among Households Meeting Iron EAR by Place of Residence and Wealth Quintile: Philippines, 2013



Mean one-day per capita iron intake and proportion of household meeting EAR for iron by region: Philippines, 2015

Region	Intake (mg)	Proportion of HH Meeting EAR	95% CI LL	95% CI UL
Philippines	9.7	9.2	9.5	9.9
NCR	10.9	11.2	10.4	11.5
CAR	10.5	11.4	9.9	11.1
Ilocos	10.1	12	9.4	10.9
Cagayan Valley	11.1	15	10.3	11.9
Central Luzon	10.0	8.9	9.5	10.5
CALABARZON	9.8	9.1	9.4	10.2
MIMAROPA	9.2	11.5	8.5	9.9
Bicol	9.0	7.6	8.5	9.4
Western Visayas	9.9	9.1	9.2	10.6
Central Visayas	8.6	6.6	8.0	9.3
Eastern Visayas	9.3	6.8	8.9	9.8
Zamboanga Peninsula	9.6	9.2	8.8	10.4
Northern Mindanao	8.6	6.7	8.1	9.1
Davao	8.6	6.4	8.1	9.2
SOCCSKSARGEN	9.3	8.9	8.7	9.9
ARMM	9.2	11.8	8.4	10.0
Caraga	8.8	6.6	8.5	9.2



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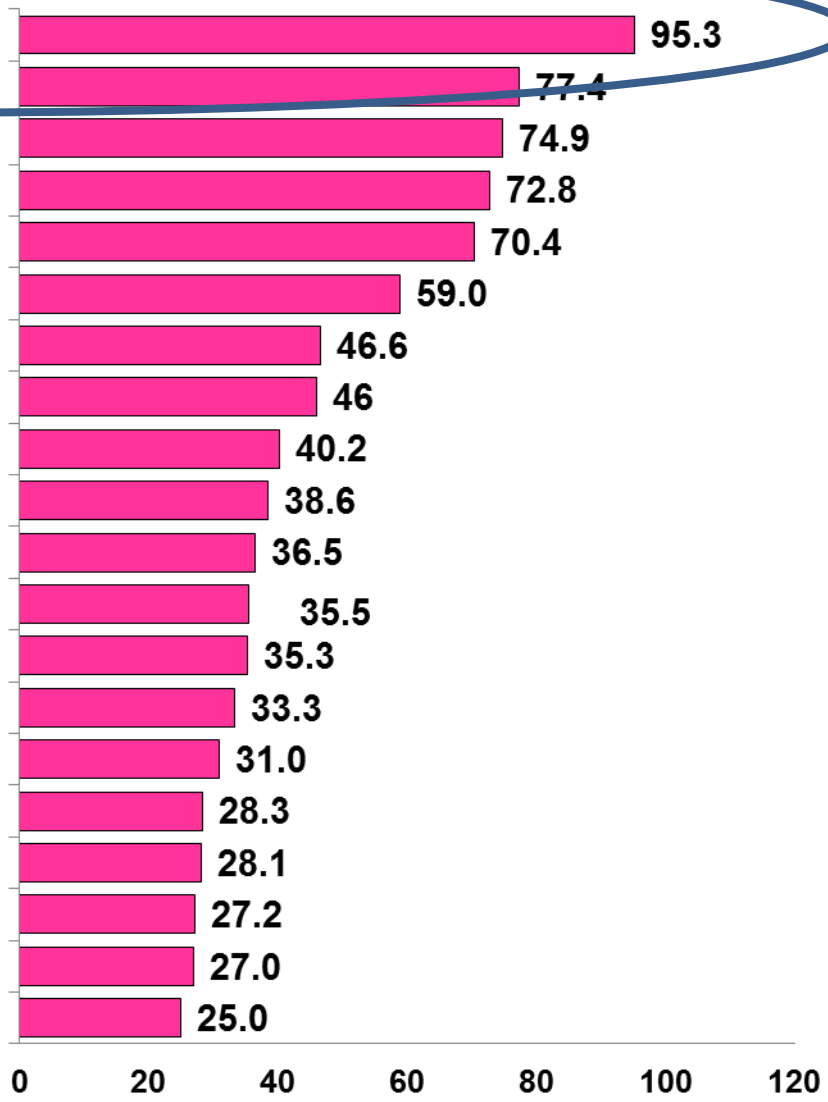
What have been done to address all these concerns?

Commonly Consumed Foods Among Households: Philippines, 2013

Food Item	Intake (g)	% of HH Consuming
1. Rice	290	95.3
2. Salt	4	77.4
3. Cooking Oil	10	74.9
4. Coffee	5	72.8
5. Bread	15	70.4
6. Sugar	8	59.0
7. Green Leafy Vegetables	23	46.6
8. Onion	4	46
9. Garlic	2	40.2
10. Egg	16	38.6
11. Soy sauce	4	36.5
12. Pork meat	35	35.5
13. Condiments	2	35.3
14. Vinegar	4	33.3
15. Vetsin	0.3	31.0
16. Processed Fish	13	28.3
17. Noodles, instant	9	28.1
18. Processed Meat	22	27.2
19. Powdered Milk	4	27.0
20. Chicken	30	25.0



Commonly Consumed Foods of Among Households by Place of Residence: Philippines, 2013

Food Item	Urban (g)	% of HH Consuming
1. Rice	290	98.1
2. Bread	15	78.6
3. Cooking Oil	10	78.2
4. Coffee	5	73.7
5 Salt	4	72.5
6. Sugar	8	53.5
7. Onion	4	48.1
8. Pork meat	35	45.6
9. Green Leafy Veg.	23	43.7
10. Egg	16	41.9
11. Soy sauce	4	39.4
12. Garlic	2	39.3
13. Condiments	2	39.0
14. Processed Meat	22	34.2
15. Vinegar	4	33.6
16. Chicken	30	32.5
17. Powdered Milk	4	30.3
18. Noodles, instant	9	29.1
19. Processed Fish	13	25.9
20. Vetsin	0.3	24.0

Food Item	Rural (g)	% of HH Consuming
1. Rice	290	91.8
2. Salt	4	83.0
3. Coffee	5	71.7
4. Cooking Oil	10	71.1
5. Sugar	8	65.3
6. Bread	15	61.1
7. Green Leafy Veg.	23	50.0
8. Onion	4	43.7
9. Garlic	2	41.3
10. Vetsin	0.3	39.1
11. Egg	16	34.9
12. Soy sauce	4	33.2
13. Vinegar	4	32.9
14. Condiments	2	31.1
15. Processed Fish	13	31.0
16. Noodles, instant	9	27.0
17. Dried Fish	10	25.9
18. Pork meat	35	24.0
19. Powdered Milk	4	23.2
20. Malunggay	5	23.0

Commonly Consumed Foods of Among Households by Wealth Index: Philippines, 2013

Poorest	%	Poor	%	Middle	%	Rich	%	Richest	%
Rice	86.6	1. Rice	93.8	1. Rice	97.2	1. Rice	98.4	1. Rice	99.3
2. Salt	80.4	2. Salt	79.6	2. Salt	80.1	2. Cooking Oil	80.3	2. Cooking Oil	82.3
3. Coffee	66.6	3. Cooking Oil	72.4	3. Cooking Oil	79.5	3. Bread	77.5	3. Bread	82.2
4. Cooking Oil	59.1	4. Coffee	70.5	4. Coffee	76.1	4. Coffee	76.4	4. Salt	74.0
5. Sugar	59.0	5. Bread	66.5	5. Bread	72.0	5. Salt	73.9	5. Coffee	73.6
6. Bread	53.2	6. Sugar	62.2	6. Sugar	61.7	6. Sugar	58.4	6. Pork meat	58.1
7. Green Leafy Veg.	50.1	7. Green Leafy Veg.	48.6	7. Green Leafy Veg.	45.9	7. Onion	53.6	7. Onion	56.6
8. Vetsin	38.3	8. Onion	40.7	8. Onion	45.8	8. Pork meat	45.6	8. Sugar	54.6
9. Onion	33.0	9. Garlic	38.4	9. Garlic	41.7	9. Egg	44.9	9. Condiments	50.5
10. Garlic	30.9	10. Egg	37.5	10. Egg	40.5	10. Garlic	44.0	10. Garlic	46.5
11. Dried Fish	29.3	11. Vetsin	36.5	11. Soy sauce	36.4	11. Condiments	43.8	11. Green Leafy Veg.	45.9
12. Processed Fish	27.1	12. Soy sauce	34.6	12. Vinegar	35.0	12. Soy sauce	43.7	12. Processed Meat	45.5
13. Vinegar	26.6	13. Vinegar	34.4	13. Vetsin	34.3	13. Green Leafy Veg.	42.7	13. Egg	44.7
14. Noodles,instant	25.7	14. Processed Fish	31.0	14. Pork meat	34.3	14. Vinegar	36.3	14. Soy sauce	42.0
15. Soy sauce	25.6	15. Noodles,instant	30.2	15. Condiments	33.4	15. Powdered Milk	34.2	15. Chicken	39.1
16. Egg	24.6	16. Condiments	28.8	16. Processed Fish	30.6	16. Processed Meat	33.3	16. Powdered Milk	38.3
17. Malunggay	23.1	17. Dried Fish	25.7	17. Noodles,instant	30.1	17. Chicken	32.5	17. Vinegar	34.6
18. Condiments	19.2	18. Pork meat	24.6	18. Powdered Milk	24.7	18. Noodles,instant	27.0	18. Tomatoes	27.7
19. Corn	18.6	19. Powdered Milk	22.7	19. Processed Meat	24.1	19. Processed Fish	25.7	19. Noodles	27.5
20. Eggplant	16.7	20. Malunggay	22.7	20. Chicken	23.0	20. Vetsin	25.5	20. Processed Fish	26.8

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TRANSLATING R&D RESULTS TO POLICY

"An Act Establishing the Philippine Food Fortification Program and for other Purposes"

Required full implementation on the fortification of staples in 2004 including rice with iron

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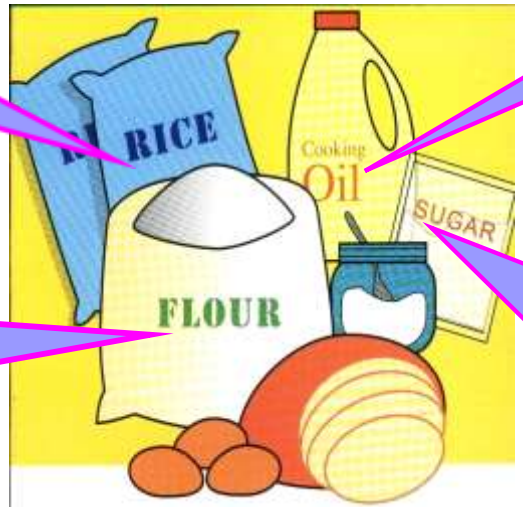
Republic Act 8976 Components

1. Mandatory Fortification by November 7, 2004

Rice with Iron

Flour with Vitamin A and Iron



Edible Oil with Vitamin A

Sugar with Vitamin A (still on moratorium because of technological issue)

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Republic Act 8976 Components

2. Voluntary Fortification Processed Food thru Sangkap Pinoy Seal

Canned goods

Snack foods

Noodles

Baby Food

Margarine

Fruit juice/drinks & other beverages

FORTIFIED
ACCEPTED BY
Sangkap Pinoy
DEPARTMENT OF HEALTH
Vitamin A, Iron, & Iodine

- Added nutrients shall supply at least 1/3 of the RDA or RENI of the target consumer,
- Except that vitamin C shall be supplied at not less than 100% of the RENI in fortified juices/ flavored drinks.

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What have been done in rice fortification since then?

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Research and Development Efforts of FNRI 2001 to present

Strategies to Control Micronutrient Malnutrition

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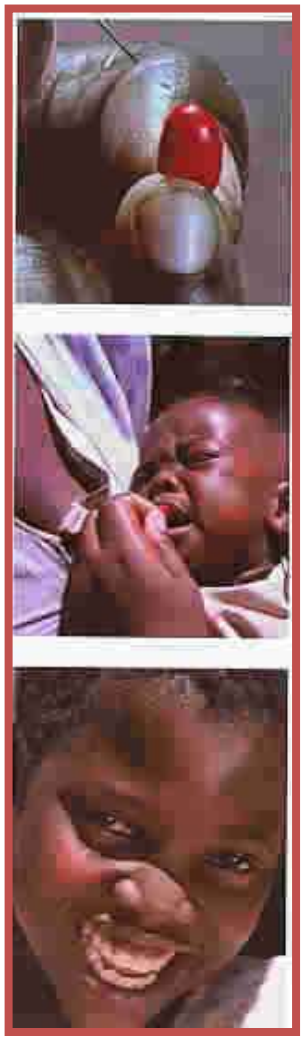
1. Micronutrient supplementation

- administration of supplements or large doses of micronutrient to correct existing deficiencies or avoid their development
- short term solution
- costly ($ 1.14-/per person year of protection)
- mostly government expense



Strategies to Control Micronutrient Malnutrition

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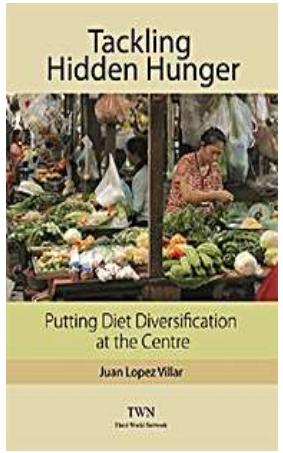
2. Dietary Diversification

- increasing both the quantity and the range of micronutrient-rich foods consumed
- improve availability and consumption and access to different types of micronutrient-rich foods (animal products, fruits and vegetables)
- long term and difficult to achieve impact
- costly ($3.13-4.82/person year of protection)



Strategies to Control Micronutrient Malnutrition

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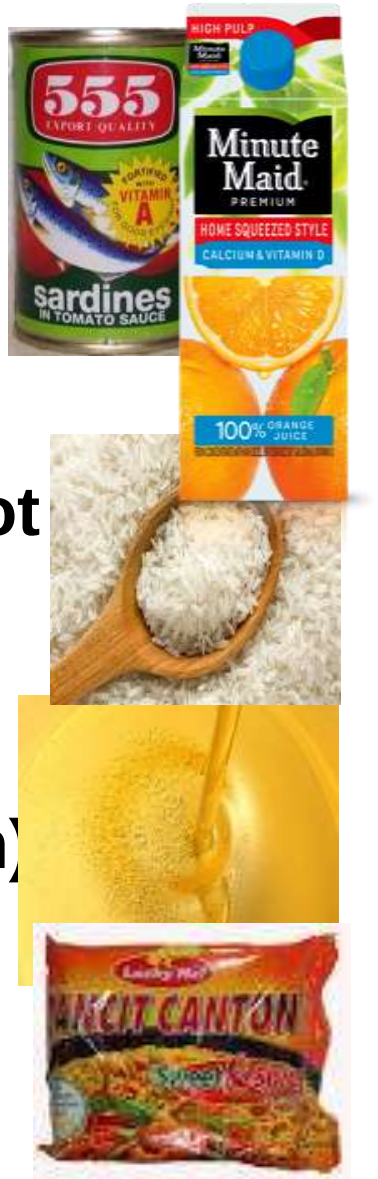
3. Food Fortification

- addition of micronutrients to processed foods
- access and use of fortificants that are well absorbed yet do not affect the sensory properties
- medium to long term
- most cost-effective strategy ($0.17/person year of protection)



Intervention Strategies

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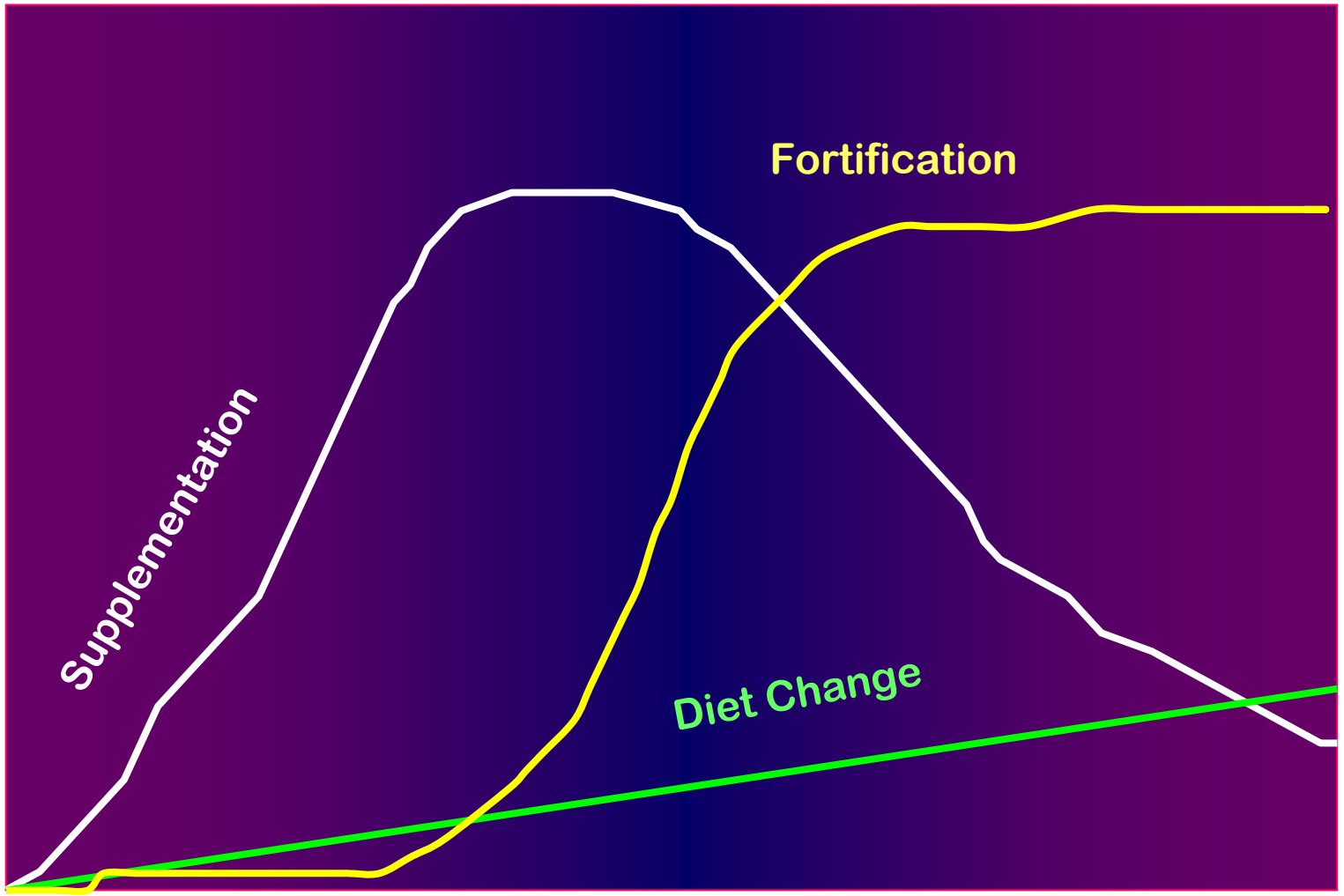

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Fortification, or synonymously "Enrichment "as defined by Codex Alimentarius

"the addition of one or more essential nutrients to food, whether or not it is normally contained in the food, for the purpose of preventing or correcting a demonstrated deficiency of one or more nutrients in the population or specific population groups"

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Food Fortification Technology

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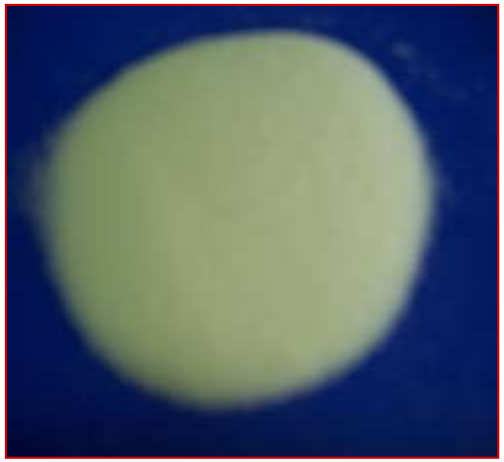
Fortificant & Food Vehicle

FORTIFICANT- a substance, in chemical or natural form, added to specific food vehicle to increase its nutrient value



Potassium Iodate Crystal, USP

Squash as a source of B-carorotene

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Fortificant & Food Vehicle

Food vehicle- it is a means to supply the nutrient

Fortificant & Food Vehicle

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Premix- a product formed by combining the food vehicle with a high concentration of fortificant

Ordinary Rice

Ferrous Sulfate

Iron Rice premix

water

Iodine premix

Fortificant & Food Vehicle

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Fortified Product- is a product to which a forticant or nutrient in the form of premix has been added at a certain ratio

1 g iron extruded premix *200g ordinary rice*

Extruded Iron Fortified Rice

5 ml Iodine premix *5 gallon purified water*

1 gal Tubig Talino

Food Fortification Process

- **Involves addition and mixing of the fortificant to the food either through of the following:**

1. **Solid to Solid Mixing**
   - **Dry Mixing, adhesion, etc**
2. **Liquid to Solid Mixing**
   - **Spraying**
3. **Coating**
4. **Extrusion**
5. **Liquid to Liquid Mixing**
   - **Dissolution in Oil**

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Food Fortification Process

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1. **Solid to Solid Mixing**
   (dry mixing, adhesion, etc.)

Batch Type Mixers:

drum mixer, screw mixer, ribbon blender, Y-mixer

Octagonal Mixer

Y-mixer

Drum Mixer

Ribbon Mixer

Food Fortification Process

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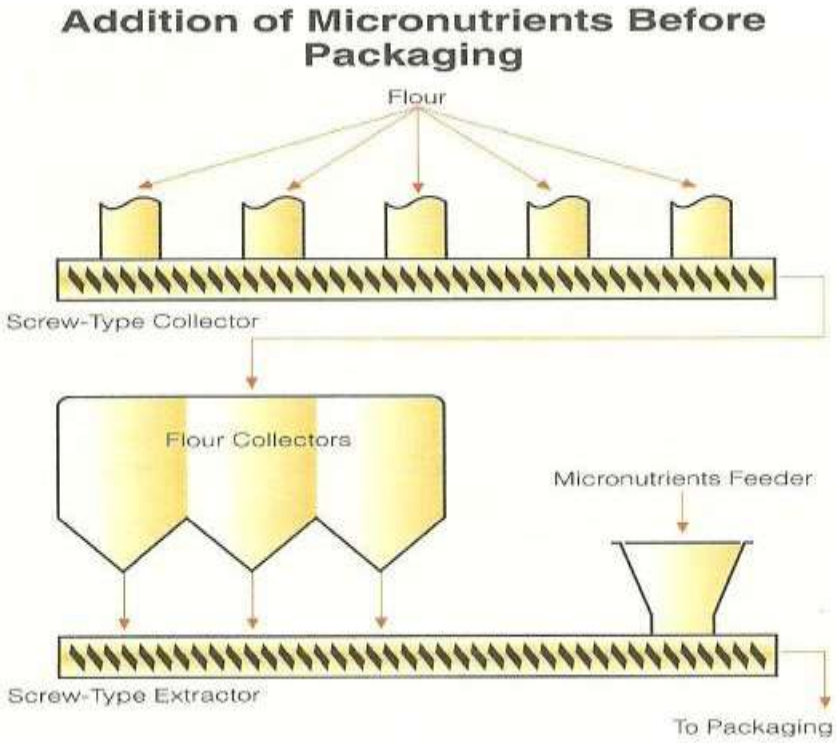
Dry Mixing - for food like cereal flour and their products, powder milk, beverage powders, etc.



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Food Fortification Process

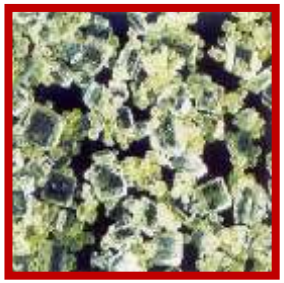
Adhesion - for sugar fortification, vitamin A in powder beadlets form is adsorbed on to the surface of the sugar crystals using a vegetable oil

Vitamin A

Loading

Sugar, Oil & Antioxidant

Vitamin A Premix



Mixing of premix with sugar

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Food Fortification Process

2. Liquid to Solid Mixing (Spraying)

- Addition of the fortificant in liquid form or solution by spraying in the food product located in the mixer
- For a batch type operation , spraying is done by any type of atomized sprayer to food in either rotating drum, ribbon blender or screw type batch mixer

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Food Processing Process

Spraying - for corn flakes, iodized salt and other processed foods requiring cooking or extrusion steps that would destroy vitamin activity.

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Food Fortification Process

Liquid to Solid Mixing (Spraying)

- For a continuous operation spray nozzle should be positioned over a belt conveyor or screw mixer

Continuous Mixer in Salt Fortification

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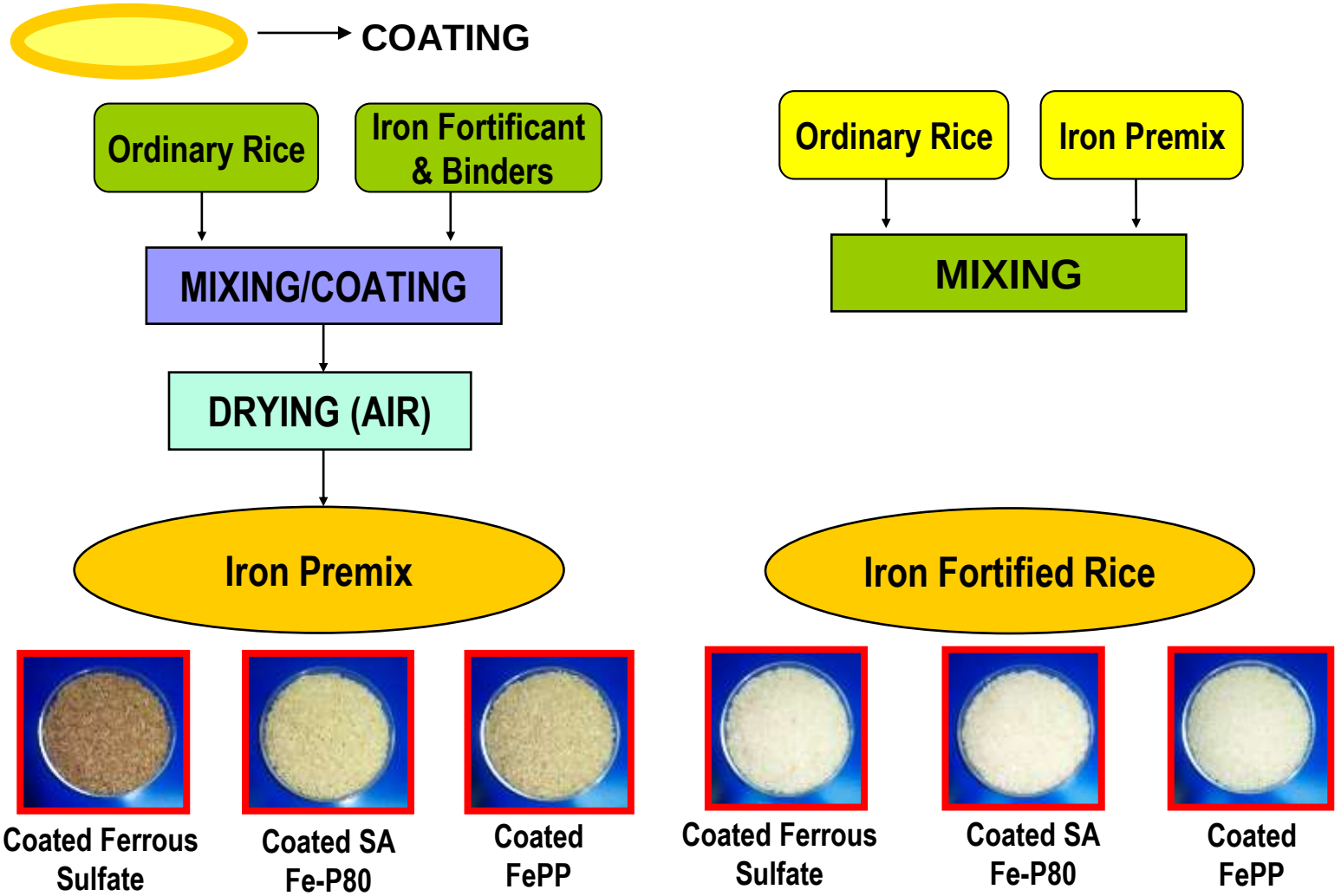
3. **Coating** - mixtures of waxes, gums and fortificant, etc. is sprayed to the surface of the rice in several layers to form the rice-premix



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4. HOT EXTRUSION TECHNOLOGY

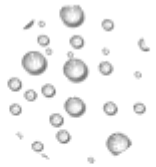
-Simply the operation of shaping a dough-like material by forcing it through a die using HTST.

-It can be used to cook, form, texturize and shape food products under conditions that favors quality retention, high productivity and low cost at a temp. 70-110 C

HOT EXTRUSION

rice flour

fortificant



water

other ingredient

IRON RICE PREMIX

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Iron Rice Premix (IRP)

- is a grain-like structure or kernel
- made from a blend of rice flour, iron and other ingredients
- produced or manufactured by hot extrusion technology
- added to ordinary rice to increase iron content.

PRODUCTION OF IFR USING BLENDING MACHINE

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IRON FORTIFIED RICE

Iron Fortified Rice is an enriched rice made by blending **premix** with **ordinary rice** at a ratio of 1:200 ratio using an efficient blending machine.

Iron Fortified rice can be washed and cooked like ordinary rice. A day's intake of 4-6 cups of cooked fortified rice will meet more than 40-60% of iron requirement of the body.

Blending Machine

Benefits of Extruded Iron Fortified Rice

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Iron is retained after washing

Effective in reducing anemia

Efficacious in reducing anemia

Long shelf-life

Other Properties of Extruded Iron Fortified Rice

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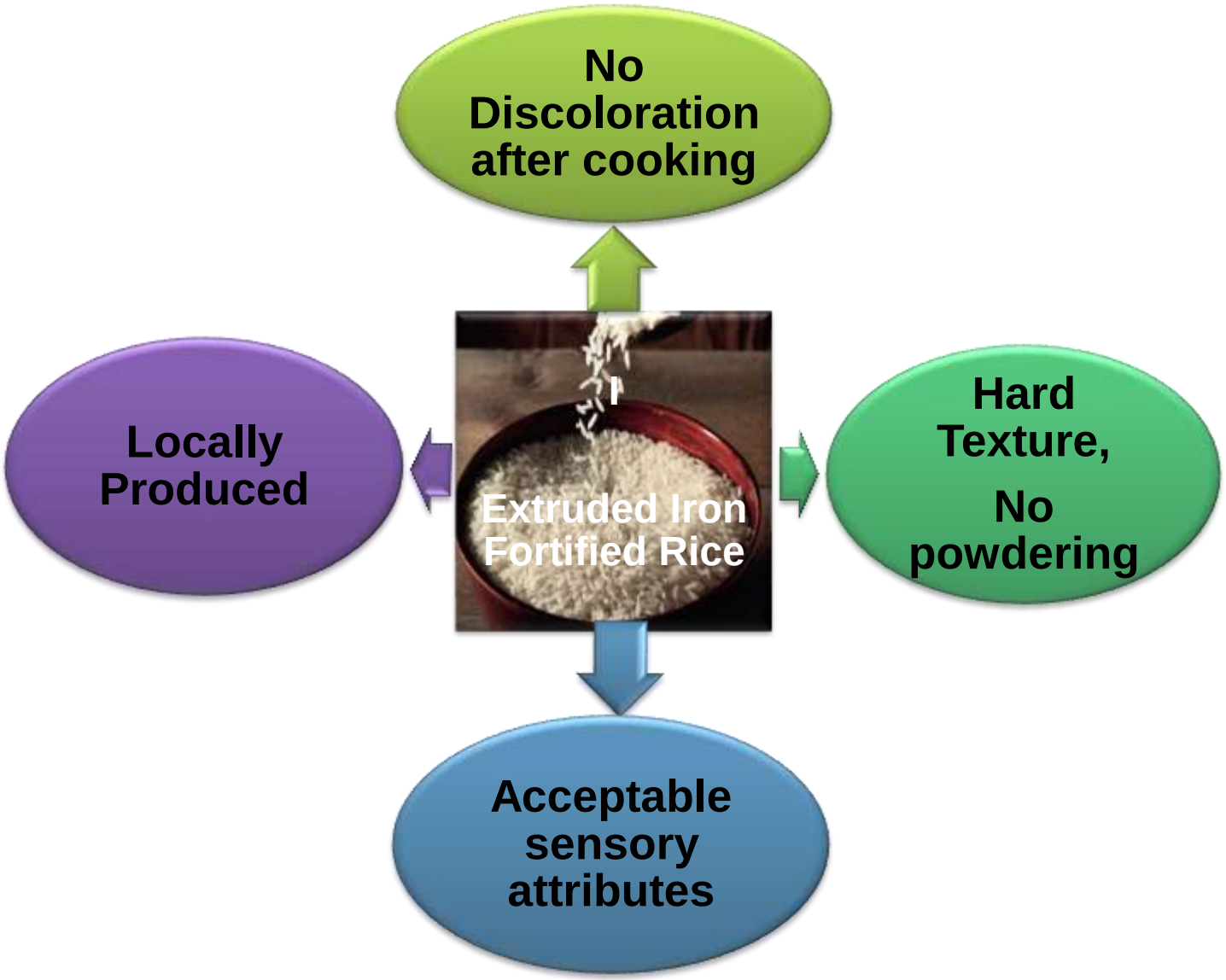

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THE EFFICACY OF IRON FORTIFIED RICE IN REDUCING ANEMIA AMONG SCHOOLCHILDREN IN THE PHILIPPINES

Published: IJVNR 2008

Efficacy Study

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- Feeding of iron enriched rice among school children in Pasig for 120 days

- Three enriched rice and a control were tested
- Results of the study showed that IFR with ExFeSO4 and Extruded ExFeP80 were efficacious in reducing IDA among school aged children

Agdeppa et al 2005

Efficacy Study

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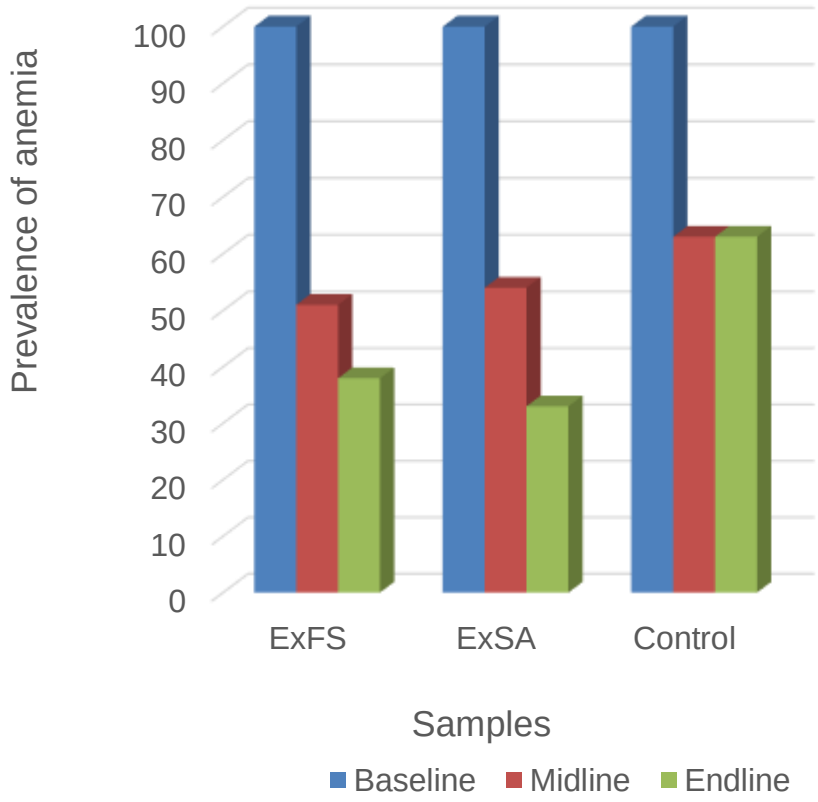

Agdeppa et al 2005

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Conclusion:

- The consumption of iron-fortified rice, using either FeSO4 or micronized dispersible FeP80 as fortificant can effectively improve iron status, thereby reducing IDA among schoolchildren when fed over a period of at least 120 days.

Published: IJVNR 2008

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Recommendations:

- Results of the efficacy study showed that IFR is a strategy that could be implemented to address the persistent problem on IDA
- However, results of small-scale efficacy trials are not always translated to large-scale effectiveness trials because delivery mechanism is always a barrier
- Social marketing or using commercial marketing techniques to “design and implement programs to promote socially beneficial behavior change” has increased within the public health sector to download results of efficacy trials in a community setting.

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PILOT-SCALE COMMERCIALIZATION OF IRON-FORTIFIED RICE: EFFECTS ON ANEMIA STATUS

Orion, Bataan

Published : FNB 2011

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Purpose:

- A market trial to commercialize IFR was conducted in Orion, Bataan to determine the effects of social marketing in commercializing IFR as a strategy to reduce anemia rate in the population

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Comics

Poste

Ano ang IRON?

- Ang "IRON" ay isang mineral na may mahalagang tungkulin sa pagbuo ng pulang dugo.
- Ito ang tumutulong upang maging malakas ang ating katawan, maging matalas ang ating pag-iisip, at magkaroon ng mataas na resistensya laban sa sakit.

Ano ang IRON DEFICIENCY ANEMIA (IDA)?

- Ang IRON DEFICIENCY ANEMIA (IDA) ay kakulangan ng pulang dugo o tinatawag na hemoglobin sa katawan na kung saan ang lebel nito ay mas mababa kesa tinaguriang normal na lebel na 120 milligrams per liter. Ito ay nangyayari kung ang naipon nating iron sa ating atay ay nagamit na dahil sa matagalang kakulangan sa pagkaing mayaman sa iron.

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- Monitoring and evaluation of the availability and quality of IFR both at the mill site, rice dealer at the public market and barangay variety stores

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- Monitoring: house-to-house interview on the 5th and 9th months to determine whether program's message was reaching the consumers and getting attention to buy and consume IFR. Market survey was also done

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Conclusion/Lesson Learnt:

- The underlying factors of a sustainable commercialization of iron-fortified rice were strong political support, close-knit cooperation and commitment of partners, intensive and continuous social marketing activities with simple culturally acceptable messages of IEC materials and maintaining the quality of the product

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Conclusion/Lesson Learnt:

- The key determining factors, however, in enticing people to consume iron-fortified rice are keeping the cost at a level affordable to the people and keeping the rice accessible by maintaining supply.

- The consumption of iron fortified rice may have contribution to the significant reduction in the prevalence of anemia among children, and, hence, commercialization of iron-fortified rice could be considered as one of the strategies for reducing anemia prevalence.

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Modeling the Commercialization of Iron-fortified Rice in Selected Districts of Zambales: A Result of Techno-transfer

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Purpose of the study:

- Because the Orion study was not implemented as planned because of the rice crisis
- This study aims to document the processes, enhancing factors and barriers involved in commercializing iron-fortified rice utilizing social marketing as reference for a national launch

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- Study site: Zambales province (7 municipalities and 1 city)

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BRANDING

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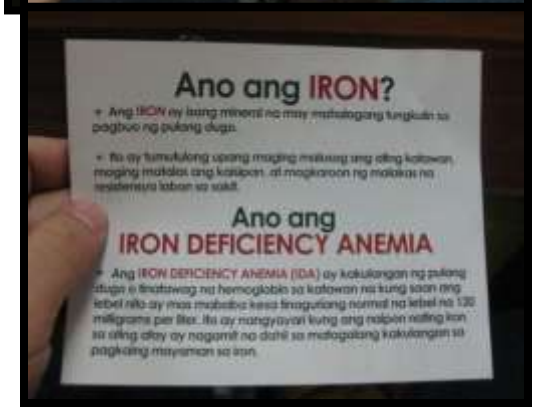
❖IEC Materials (Poster)

Flyers



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Promotional Activities

- **Launching of the 8 City/Municipalities of Zambales**

LED MOTORCADE

Message from the

Ceremonial Tasting of SupeRice!!!

The Product

SupeRice Sinandomeng

SupeRice Angelica

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<u>Price</u> – similar with ordinary rice of the same variety.

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<u>Political Support</u> – issuance of Municipal Ordinance, mobilization of LGU staff to monitor project flow, responsible for resource generation .

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Product Positioning

Data collection

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Biochemical Assessment Blood Collection

Socio Economic and KAP Assessment

Clinical Assessment

Anthropometric Assessment

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- **Monitoring of the implementation of the IFR project in Zambales is done separately by the provincial/ city/ municipal nutrition committees and the FNRI**

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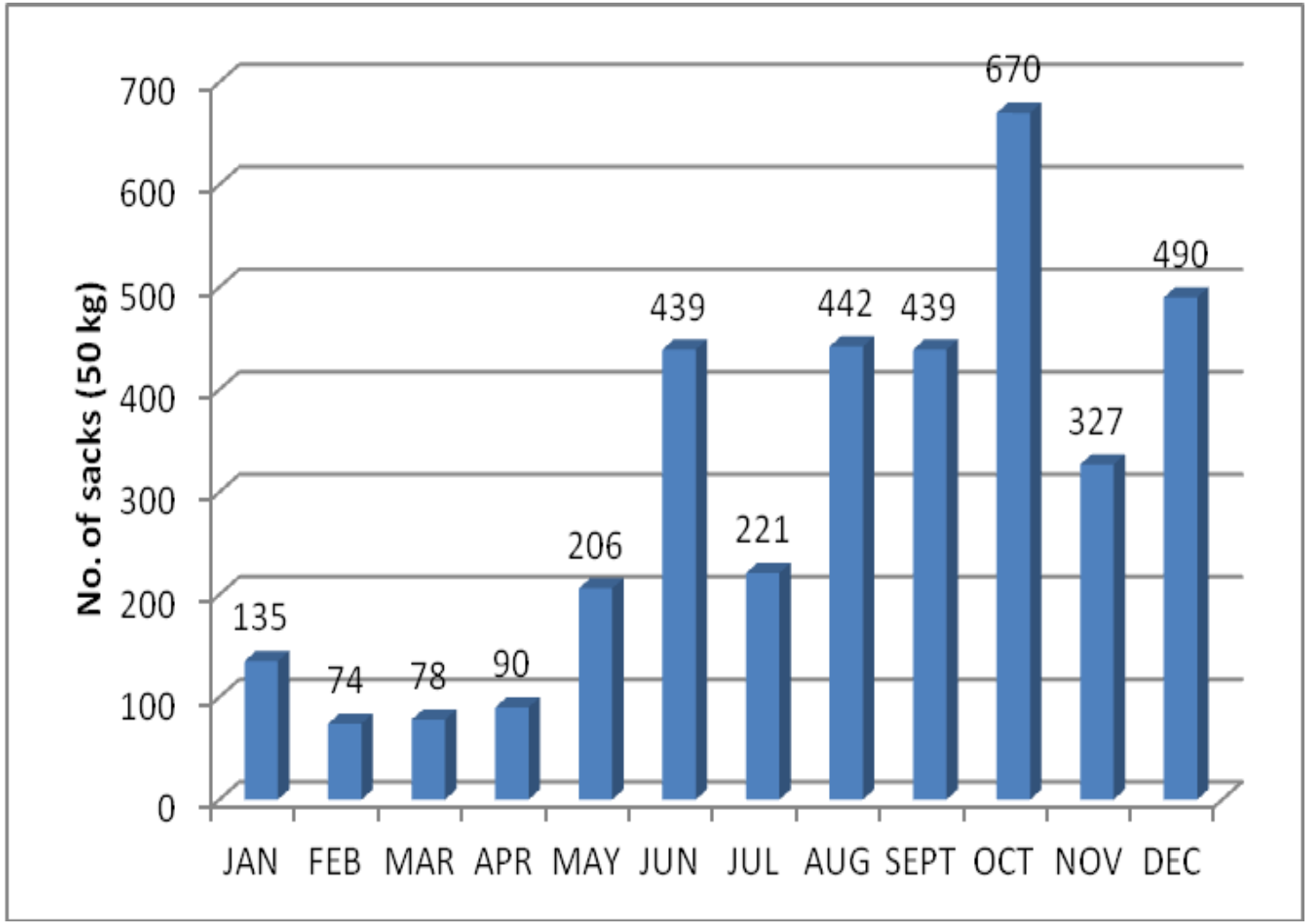

Iron Fortified Rice Production and Sales

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Results

Mean hemoglobin and anemia prevalence of children subjects in the sentinel site

Variable	Baseline (n=345)	Endline (n=345)	p
Mean ± SD	12.3 ± 0.9	13.0 ± 0.9	<0.001
Anemic No. (%)	113 (32.8)	38 (11.0)	

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Conclusion/Lesson Learnt:

✓ It was concluded that new downloaded programs from the national to local levels achieves greater benefits when intensive monitoring and technical assistance is extended during the initial stages of project implementation.

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In 2006: FNRI opened the doors for partners to adopt the technology of the production of Iron Premix Rice and Iron Fortified Rice

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Iron Fortified Rice (IFR) – 50kg
J .D. Aguilar Commercial Center, Nueva Ecija

Feeder/Dosifier for Continuous Premix Production

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Food and Nutrition Research Institute

Department of Science and Technology

Nutrition & Beyond Corporation San Leonardo, Nueva Ecija

FNRI

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Department of Science and Technology

Iron Fortified Rice (IFR) –25 kg NUTRIDENSE Food Manufacturing Corporation

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Department of Science and Technology

Dosifier Continuous Premix Equipment at Nutridense, Loronix Rice Mill, Compostela Valley)

Batch-type Premix Production Equipment

Continuous Blending Machine	P400,000 and 300,000
Batch-Type Blending machine	P 50,000

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DEPARTMENT OF SCIENCE AND TECHNOLOGY

Scaling-up Rice Fortification Program Through Techno-Transfer: A Strategy Towards Nutrition Security: 4th study

FUNDING SOURCES:
TechniCom Funded Project – DOST (April 2013 to June 2015)
ILSI –CHP, JAPAN -

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DEPARTMENT OF SCIENCE AND TECHNOLOGY

Study site: Davao Region

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Goal:

- To enable private mills to acquire and adopt the technology in the production of iron premix rice (IPR) and iron fortified rice (IFR), making IFR available, affordable and accessible for consumption of all Filipinos to achieve food and nutrition security.

Implementation of Iron Fortified Rice in Compostela Valley

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Millers Forum 2016

June 21, 2016 at Vigan, Ilocos Sur

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DEPARTMENT OF SCIENCE AND TECHNOLOGY

Conclusions on rice fortification efforts:

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- ✓ IFR is safe and efficacious in reducing anemia rate, hence improving health of the populace.
- ✓ These evidences on studies of IFR are used by FDA, DOH, DepEd, DSWD in crafting guidelines and policies for their safety net programs

Conclusions on rice fortification efforts:

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- ✓ Other countries use the publications as references and experiences have been shared in several forums: National and International

Conclusions on rice fortification efforts:

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- ✓ Researchers have been invited as consultants in Indonesia and Vietnam
- ✓ FNRI provided the fortified rice premix (Fe and Zn) which was used in the market trial study in Vietnam
  - A site visit was conducted last February 2017

Conclusions on rice fortification efforts:

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- ✓ The Philippines is a member of the multi-country Consortium of Rice Fortification
  - 1st Consortium Meeting in Bangkok, Thailand in 2014
  - 2nd Consortium Meeting in Davao City, Philippines in 2015
  - 3rd Consortium Meeting in New Delhi, India in 2016

Conclusions on rice fortification efforts:

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- ✓ Partnerships with private sectors pave the way for the accessibility of IFR
  - Technology adoptors in Luzon and Mindanao
- ✓ Millers' Forum conducted last June 2016 in Vigan, Ilocos Sur

Conclusions on rice fortification efforts:

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- ✓ In every new product and technology to be downloaded at the local level or to the community, appropriate social marketing and advocacy activities should be an integral part of the project for it to be successful

Conclusions on rice fortification efforts:

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- ✓The technology of IFR addresses three pronged issues:
  - **nutrition security – increased iron intake**
  - **food security by increasing rice supply**
  - **economic security – higher value rice for higher cost**

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Sectoral Accomplishments of IFR R&D Efforts by FNRI:

- Basis of DepEd guidelines in School Nutrition Program on the use of IFR in Supplementary feeding.
- Basis of released Department of Health Memorandum Circular on the use of iron fortified rice in hospital dietary sections.
- Basis for the Department of Social Welfare guidelines – IFR in the food package.

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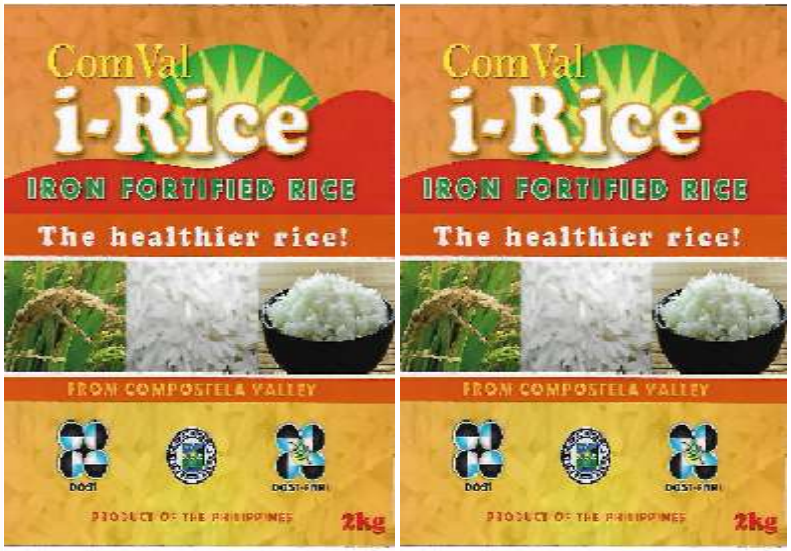
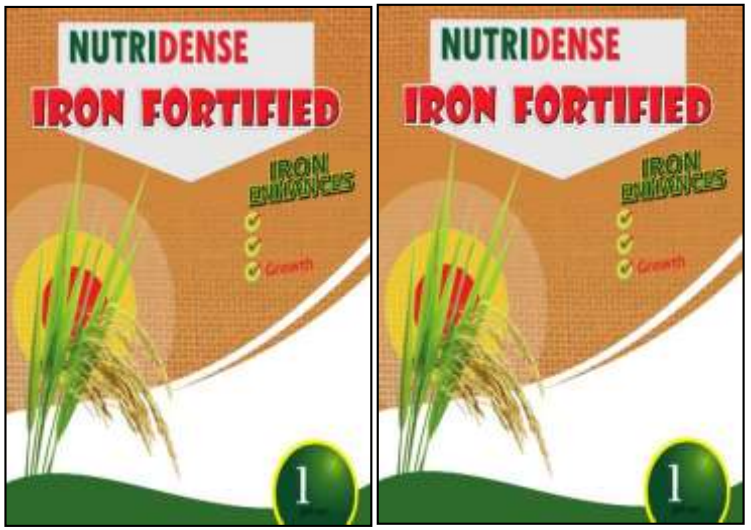


Iron Fortified Rice (IFR) – 2 kg
Loronix Rice Mill, Compostela Valley

Iron Fortified Rice (IFR) – 2 kg
CLG Health Food Products, Inc.,
Connel Road, Gensan City

Iron Fortified Rice (IFR) – 2 kg
J .D. Aguilar Commercial Center
San Leonardo, Nueva Ecija



Iron Fortified Rice (IFR) – 1 kg
J .D. Aguilar Commercial Center
San Leonardo, Nueva Ecija

Industry Partners: Premix

1. Nutrition and Beyond Corporation
   San Leonardo, Nueva Ecija
2. CLG Health Food Products
   Connel Road, General Santos City
3. Nutri-Dense Food Manufacturing Corporation
4. Orlico Foods, Quezon City

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Industry Partners:IFR

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1. J.D. Aguilar Commercial Center
   San Leonardo, Nueva Ecija
2. Lononix Rice Mill
   Nabunturan, Compostela Valley
3. CLG Health Food Products, Inc
   Connel Road, Gensan City
4. Christine Bagayas Rice Mill
5. Nutri-Dense Food Manufacturing Corporation

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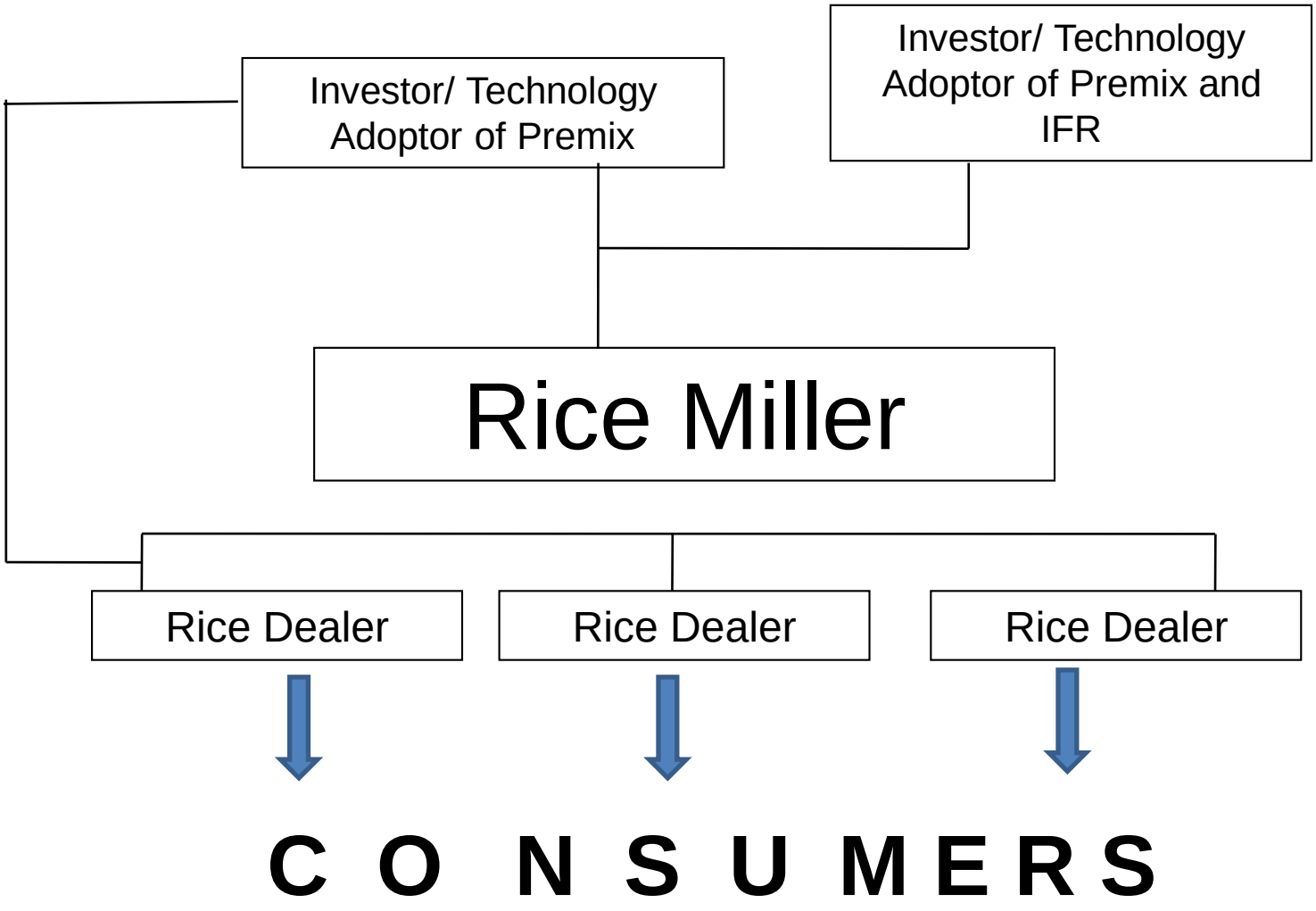
Flow Diagram of the Scaling – Up Project of IFR



POLICIES AND LOCAL/PROVINCIAL ORDINANCES

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Repu
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Nabunturan, C

EXCERPTS FROM THE MINUTES O
SANGGUNIANG PANLALAWIGAN HEL
SANGGUNIANG PANLALAWIGAN SES
COMPOSTELA VALLEY

PRESENT:

Hon. Neri R. Barte (Memb
Hon. Ruwel Peter S. Gonza
Hon. Ramil L. Gentugaya
Hon. Cesar D. Richa
Hon. Moran B. Takasan
Hon. Macario T. Humol
Hon. Paul P. Galicia
Hon. Arvin Dexter M. Lopoz
Hon. Raul C. Timogtimog
Hon. Augusto S. Blanco, Jr.

ON OFFICIAL BUSINESS:

Hon. Manuel E. Zamora
Hon. Jaywee Tyron L. Uy
Hon. Joseph T. Jaood
Hon. Randy R. Opisan

EXPLANA

Republic Act No. 8976, otherwi
was conceived and became a law i
considered rice as one of the excellent vehicles for fortification because Filipinos are basically rice-eating people regardless of income. In fact, approximately 80% of the population of Compostela Valley Province uses rice as staple food.

EXCERPTS FROM THE MINUTES OF THE REGULAR SESSION OF THE SANGGUNIANG BAYAN OF ORION, BAYAAN HELD AT THE SESSION HALL OF THE ORION MUNICIPAL LEGISLATIVE BUILDING, ARELLANO, ORION ON APRIL 1, 2008

PRESENT:

Hon. Virgilio B. Isidro	-	Municipal Vice Mayor and Presiding Officer
Hon. Isagani B. de Leon	-	SB Member
Hon. Virgilio S. Catalan	-	SB Member
Hon. Eugenia E. Mariano	-	SB Member
Hon. Reynaldo S. Waje	-	SB Member
Hon. Danilo D. Bunsoy	-	SB Member
Hon. June D. Hernandez	-	SB Member
Hon. Luz D. Austria	-	SB Member
Hon. Donaldo R. Chan	-	SB Member
Hon. Mercelita D. Cruz	-	Ex-Officio SB Member, President – Orion Liga ng Mga Barangay
Hon. Jerzon Paul V. Ramirez	-	Ex-Officio SB Member, President – Orion PPSK

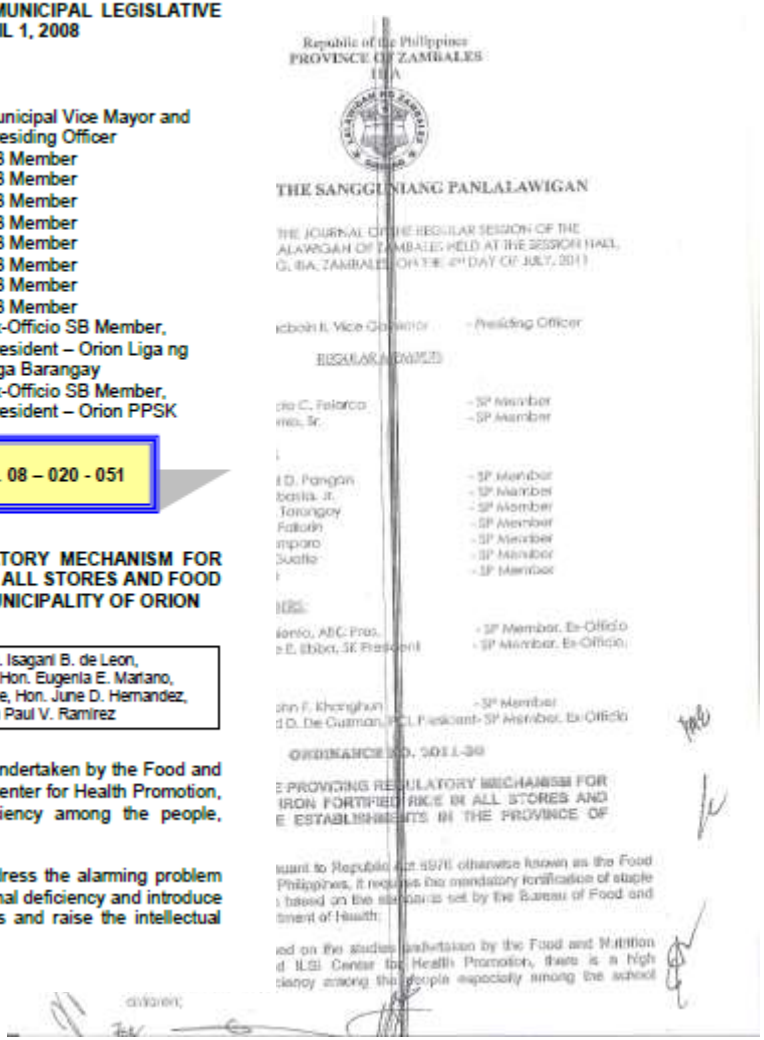
MUNICIPAL ORDINANCE NO. 08 – 020 - 051

AN ORDINANCE PROVIDING REGULATORY MECHANISM FOR THE SALE OF IRON FORTIFIED RICE IN ALL STORES AND FOOD SERVICE ESTABLISHMENTS IN THE MUNICIPALITY OF ORION

Sponsors: Hon. Danilo D. Bunsoy, Hon. Isagani B. de Leon, Hon. Donaldo R. Chan, Hon. Luz D. Austria, Hon. Eugenia E. Mariano, Hon. Virgilio S. Catalan, Hon. Reynaldo S. Waje, Hon. June D. Hernandez, Hon. Mercelita D. Cruz, Hon. Jerzon Paul V. Ramirez

WHEREAS, based on the studies undertaken by the Food and Nutrition Research Institute and the ILSI Center for Health Promotion, there is a high incidence of iron deficiency among the people, especially among the school children;

WHEREAS, there is a need to address the alarming problem by making the people aware of the nutritional deficiency and introduce reforms that would produce quality results and raise the intellectual proficiency of the school children;



Republic of the Philippines
PROVINCE OF ZAMBALES

THE SANGGUNIANG PANLALAWIGAN

Technology's Opportunity

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Philippine Rice Consumption for Social Safety Net Program for Supplementary Feeding (Maglalang, 2016)

Program	DSWD Budget for Rice	DepEd Budget for Rice
Total Budget of Government	P 739,217,880	P696,093,000
	$15,546,608	$14,609,990
Target Number	2,053,383	1,160,155
Total Budget for SSNP	1,435,310,880	
Kg, Rice Required	23,100,558.75	21,752,906.25
Est. Contribution used by SSNP	5%	

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Technology's Opportunity

4 P's Pantawid Pamilyang Pilipino Program ACT of 2000	
Proposed Benefit for 4P's	25Kg fortified rice each 4P's Family
Target Number	4,000,000
Total Amount, Kg	100,000,000

Enhancement of Family Food Packs:

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Department of Science and Technology

DEPARTMENT OF SOCIAL WELFARE AND DEVELOPMENT
Disaster Response Assistance and Management Bureau (DReAMB)

MEMORANDUM FOR THE SECRETARY	File/Ref. No.	My docs/BRADDY/enhancement of family food packs 08-03-11
	Date :	31 July 2015
FOR	HON. CORAZON JULIANO-SOLIMAN Secretary	
FROM	THE DIRECTOR IV	
SUBJECT	*ENHANCEMENT OF FAMILY FOOD PACKS*	

This is to respectfully request the approval of the Honorable Secretary for the enhancement of family food packs based on the Recommended Nutrient Intake (RENI, 2015 publication) to a family of five (5) members. The following are the recommended food items submitted by the Food and Nutrition Research Institute (FNRI- DOST) which was concurred by the technical working group composed of the DSWD, FNRI, DOST, National Nutrition Council (NNC) and the World Food Programme (WFP):

Family food pack contents for two (2) days with Key Nutrient Contribution and Cost.

FOOD ITEM	UNIT	ENERGY (Kcal)/ day	NUTRIENTS/day			COST (PhP)	
			PROTEIN (g)	IRON (mg)	VIT. A (ug)	Unit cost	Item cost
Rice, Iron Fortified	6 kgs	10,500	210	60	0	31.00	186.00
Corned Beef, Canned (150g)	2 can	306	22.4	1.4	7.5	19.70	39.40
Sardines, Canned (155g)	4 cans	394	31.6	0	167.4	13.00	52.00
Laing, Canned (155g)	2 cans	524	15.3	45	0	30.00	60.00
Pinakbet, Canned (225 g)	2 cans	200	12	0	420	30.00	60.00
Multi-nutrient growth mix (2 g.)	20 pcs.	50	0	20	2270	2.00	40.00
Instant Coffee	6 sachets	294	0.9	0	0	5.00	30.00
Total		12,268	292.2	126.40	2,864.9		467.40

Also attached is a copy of FNRI report on the Improvement of the Nutritional Quality of the DSWD Family Food Pack for your reference.

Bayanihan Para sa Kalusugan -Kusina ng Kalinga Feeding Program

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Number of Recipients : 825 pupils
Location: Compostela Valley
Number of Schools: 18 schools
Government Agency Involved: LGU and Dep.Ed
Industry Partner: Saavedra Rice Mill, Compostela

INTELECTUAL PROPERTY RIGHTS (IPR) for Iron Fortified Rice

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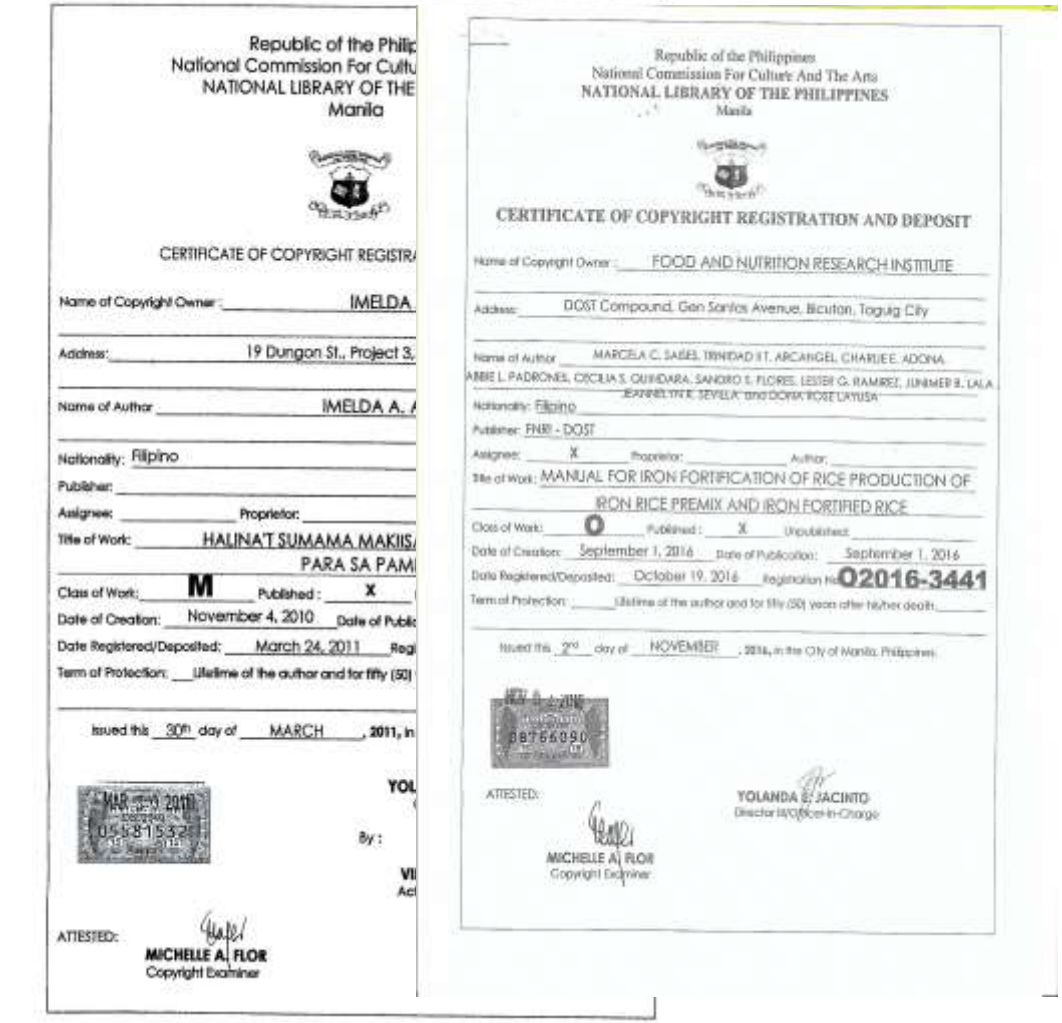

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Title of Work: MANUAL FOR IRON FORTIFICATION OF RICE PRODUCTION OF IRON RICE PREMIX AND IRON FORTIFIED RICE
Class of Work: O Published: X Unpublished
Date of Creation: September 1, 2016 Date of Publication: September 1, 2016
Date Registered/Deposited: October 19, 2016 Registration No. O2016-3441
Term of Protection: Lifetime of the author and for fifty (50) years after his/her death.
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AWARDS ANDRECOGNITION

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FOOD AND NUTRITION RESEARCH INSTITUTE
Department of Science and Technology
in cooperation with the
FOOD AND NUTRITION RESEARCH INSTITUTE
EMPLOYEES ASSOCIATION, INC
present this

Certificate of Recognition

to

Marcela C. Saises, Trinidad II I. Arcangel, Abbie L. Padrones, Charlie E. Adona, Jeannelyn R. Sevilla, Cecilia S. Quindara, Ma. Teresa F. Javier, Shiela Marie R. Gulay, Sandro S. Flores, John Lester G. Ramirez, Dona Rose Layusa and Junimer B. Lala

Consolation Prize

in the Poster Presentation Competition: S&T Category for their paper titled
Scaling up Rice Fortification Program through Technology Transfer: A Strategy Towards Nutrition Security Project 1: Technology Transfer to Private Mills
held during the 42nd FNRI Seminar Series.

Theme: "First 1000 days of Child's Life: Interventions through Research, Services and Technologies"

Given this 5th day of July 2016 at the Crowne Plaza Manila Galleria,
1100 Ortigas Avenue Extension, Quezon City.

DR. CECILIA CRISTINA S. ACUIN
Over-all Chair, 42nd FNRI Seminar Series

MARIO V. CAPANZANA, Ph.D.
Director

MILDRED A. UDARBE
President, FNRI EA, Inc.

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2017 ALBERTO ROMUALDES OUTSTANDING HEALTH RESEARCH AWARD (AROHRA AWARD 2017)

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CSC 2017 PAGASA AWARD

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Results

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Visit to investors and rice miller:



GENSAN

Davao Del Norte


Compostela Valley


Davao Oriental


Results

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Loronix Rice Mill

Bagayas Rice Mill

Saavedra Rice Mill

Fabricated Bending Machine by Edmundo Welding and Machine Shop Funded by DOST XI SET-UP

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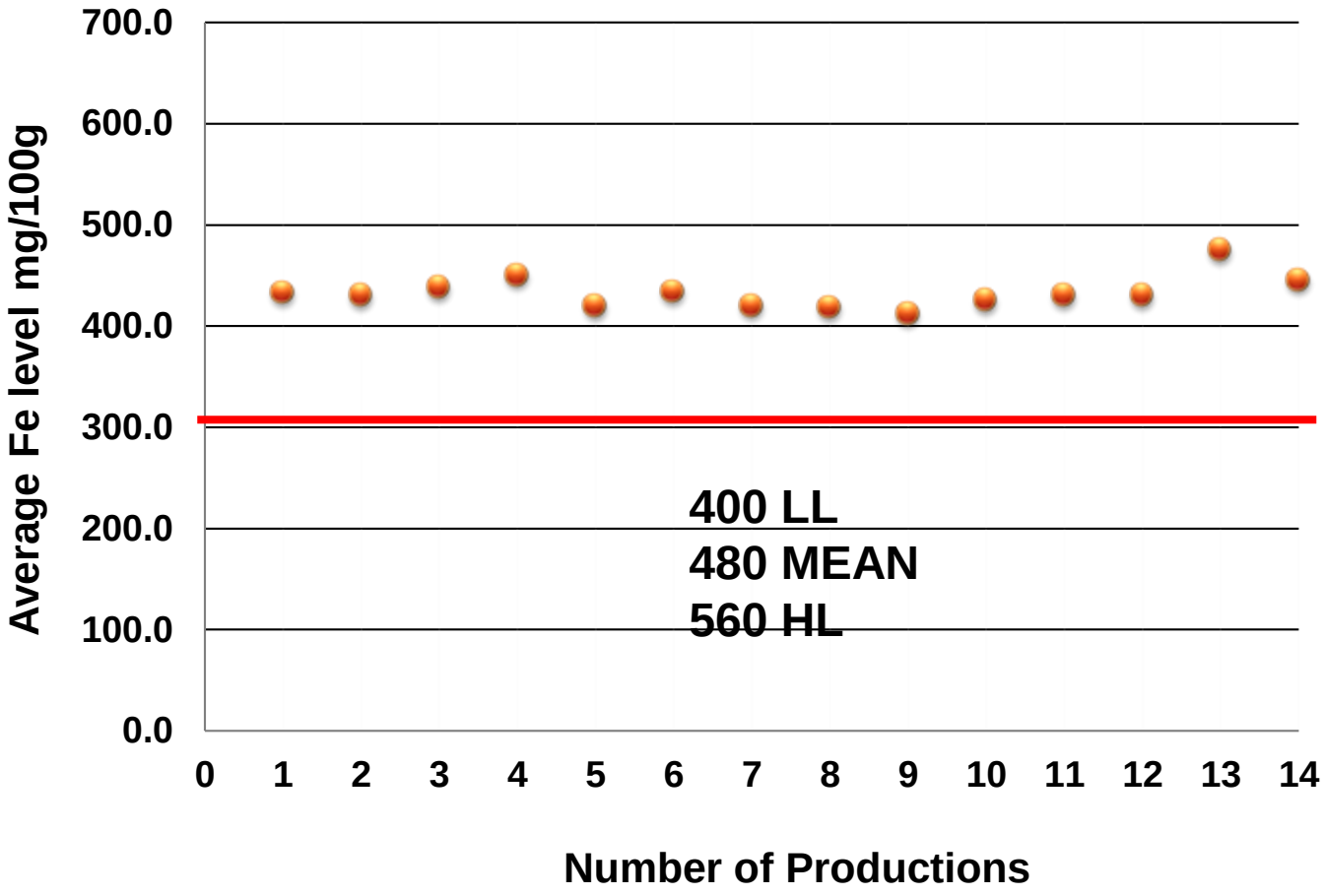
Department of Science and Technology

Results



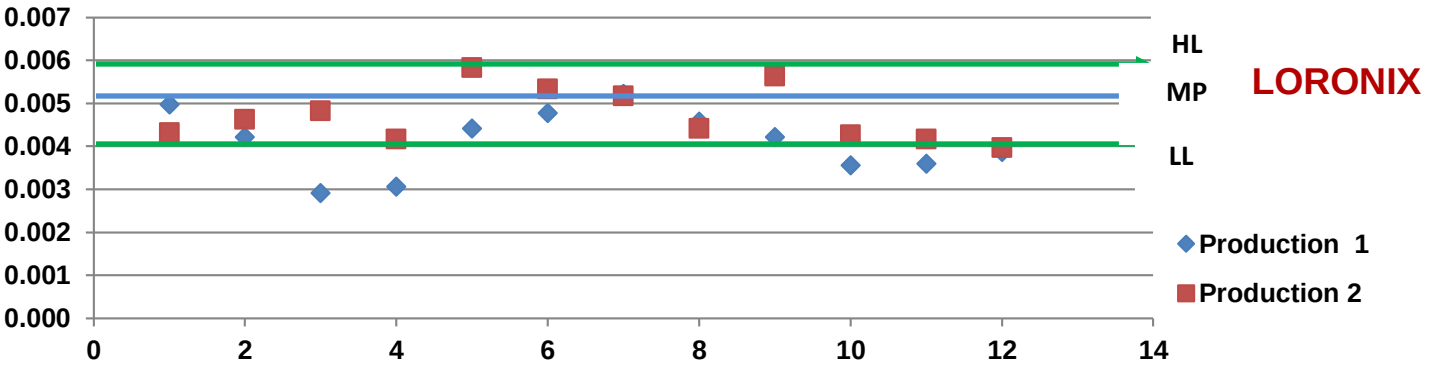
IPR Monitoring at the Production Site

RESULTS

FNRI

Food and Nutrition Research Institute

Department of Science and Technology



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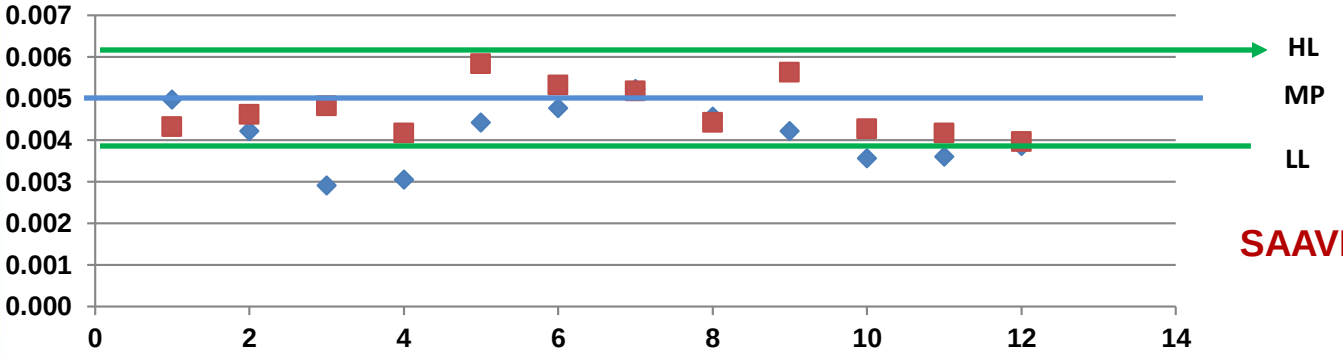

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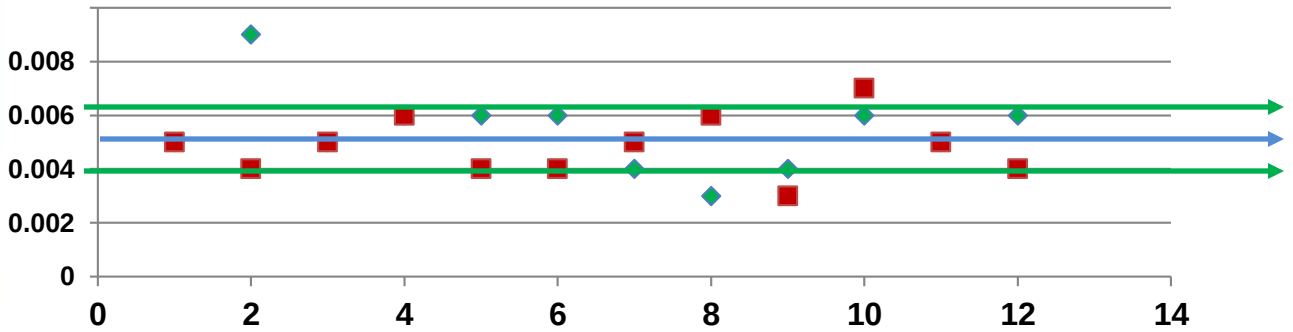

BAGAYAS

IFR Quality Control Monitoring