Public and Private Sector Dynamics in Scaling Up Rice Fortification:

The Colombian Experience and its Lessons

Becky L Tsang[1], Ralfh Moreno[2], Nazila Dabestani[2], Helena Pachón[1], Rebecca Spohrer[3], Peiman Milani[2]

[1] Food Fortification Initiative, Atlanta, USA
[2] PATH, Seattle, USA
[3] Global Alliance for Improve Nutrition, Geneva, Switzerland

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Disclaimer

Nazila Dabestani, Peiman Milani and Ralfh Moreno (at time of work) were affiliated with PATH, an international nonprofit that holds the license to Ultra Rice®, a technology to produce fortified rice

http://images.wisegeek.com/bag-of-rice-with-scoop.jpg

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Main messages

1. Rice is a suitable food to massively fortify to increase micronutrient intakes in Colombia
2. ~35% of Colombia's rice is voluntarily fortified with a spraying technology with unknown nutrient retention, stability & effectiveness
3. Several factors keep millers from adopting proven rice fortification technology
4. Costa Rican experience suggests that mandatory fortification can attain universal coverage and public health impact
5. Public sector can strengthen the public health impact of rice fortification through several actions

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Objectives

1. Describe the Colombian experience with rice fortification to date
2. Discuss rice-fortification efforts in other countries
3. Offer recommendations to Colombian policy-makers in rice fortification that may also be adapted to other contexts

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Methodology

September-October 2013, July 2015

- Interviews
- Observations
- Document reviews

http://www.thegreedyantgourmet.com/uploads/2/6/5/0/26504325/961975_orig.jpg

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Rice fortification: introduction

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Rice flour and kernels can be fortified

Rice Flour

www.holistichealthherbalist.com

Rice Kernels

www.nutridieta.com

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Rice-kernel fortification: different technologies

- Extrusion (cold, hot)
- Coating
- Dusting

Evidence that rice fortified with these technologies delivers nutrients to consumers

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Extrusion technology

English: https://www.youtube.com/watch?v=FvbEDsiqz7M

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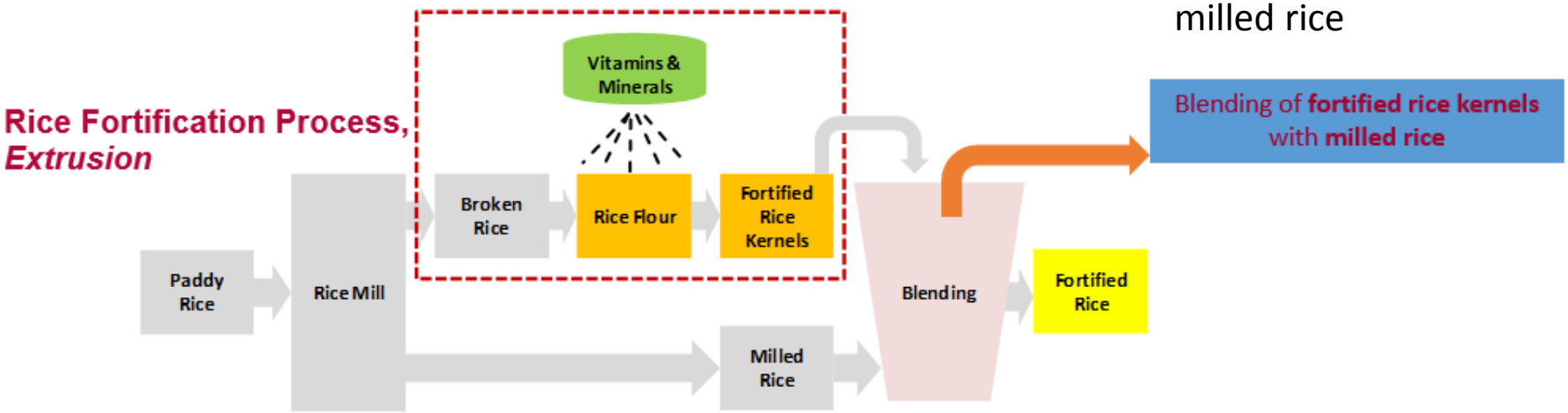
Extrusion technology

STEP 1: Create fortified "kernels"

STEP 2: Blend fortified "kernels" with milled rice



Courtesy Moench-Pfanner, 2015

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Coating technology

STEP 1: Create fortified kernels

Milled rice

Coating:
Vitamin &
Minerals

Fortified kernels

STEP 2: Blend fortified kernels with milled rice

Fortified kernels

Milled rice

Fortified rice

Courtesy Codling & Tsang 2015

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Dusting technology

- All rice grains dusted with a fortificant mix
- Limited nutrient protection
- Sedimentation risk
- Frequently done in USA
- Due to nutrient loss, not suitable in countries where rice is washed or where excess cooking water is discarded

DSM research

SCALING UP RICE FORTIFICATION IN ASIA
Bangkok, September 16-19, 2014

Courtesy Montgomery 2014

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Rice-fortification technology used in Colombia: spraying

- Unique to the country
- Micronutrients are present in a liquid solution that is sprayed at high pressure
- Waxes or gums may be used in the liquid solution to improve adherence to the surface of the grain
- Spray is applied to all rice

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Summary

- There are three globally recognized rice-fortification technologies
- Two are recommended: extrusion & coating
- Colombia uses a unique technology: spraying

http://www.heartofcool.com/wp-content/uploads/2015/06/rice-heart.jpg

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Objective 1: Describe the Colombian experience with rice fortification to date

Rice is a suitable fortification vehicle

High availability

Widely consumed across country

Consolidated industry

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Rice fortification timeline

2002

- *Arroz Roa* begins fortification: spraying
- *Unión de Arroceros* begins fortification: cold-extrusion
- Multi-sectoral discussions begin to introduce fortified rice in the country to improve public health

2003

- Due to a drop in sales and poor consumer response, *Unión de Arroceros* halts fortification of its brands

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2011
- Government discussions to mandate rice fortification begin and stall again
- *Florhuila* begins fortification: spraying

2012
- Imported rice kernels manufactured with hot-extrusion technology are considered by a leading miller but not adopted due to cost concerns

2013
- *Diana* and *Caribe* begin fortification: spraying

2014
- Owing to competitive pressures, *Unión de Arroceros* begins fortification again: spraying

2015
- ~35% of the country's rice is voluntarily fortified using spraying

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Themes that emerged

- Motivations to begin rice fortification
- Rice fortification technology unique to Colombia
- Costs to fortify rice
- Efforts to legislate mandatory fortification

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Motivations to begin rice fortification

Early 2000s: desire of Colombian rice millers to differentiate their products from those of their domestic competitors

http://www.betches.com/sites/default/files/article/list/images/1429583973_rice.jpg

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Unique rice-fortification technology used in Colombia: spraying

- No published studies conducted by any institution (private, government, academic, or other)
- Unknown: nutrient content and stability of the fortified rice after it is rinsed and cooked
- Unknown: effectiveness of fortified rice in increasing micronutrient intake in consumers

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Colombian fortification technology

Challenges to spraying technology

1. Fortification not homogeneous
2. Micronutrient losses during washing & cooking
3. Occasional formation of mold

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Colombian fortification technology

Challenges to introducing extrusion or coating technology

Mill experience with sales decline after introducing cold-extruded fortified rice

Mill reluctance to invest capital & increased recurring costs for blending fortified kernels

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Cost of fortification

Technology	Blend ratio	Increase in rice price due to fortification, per kg (%)	Incremental cost of extruded and coated fortification technologies compared to spraying
Hot extrusion	1%	1.50%	6.6-fold
	0.5%	0.75%	3.3-fold
Coating	1%	1.13%	5.0-fold
	0.5%	0.57%	2.5-fold
Spraying	Not applicable	0.23%-0.26%	--

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Cost of fortification

Costs with introducing extrusion or coating technology

For extrusion or coating: capital cost to purchase blending equipment

Small miller concerns: access to capital to purchase fortified kernels, further concentration of rice industry

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Efforts to legislate mandatory fortification

As of July 2015: no mandatory rice fortification legislation in Colombia

Millers

Initially supported mandate, assuming it could stem influx of illegally imported rice

Changed position, claiming insufficient government capacity to control illegal rice trade across borders

Draft decrees and standards

Draft decrees lacked specific language to identify micronutrients, amounts, appropriate technologies

No standards developed: micronutrients and amounts used vary by brand, unproven technology used

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Summary

- Colombian millers have over a decade of experience with the spraying technology
- ~35% of Colombia's rice is voluntarily fortified with a spraying technology with unknown nutrient retention, stability & effectiveness
- Several factors keep millers from adopting proven rice fortification technology (extrusion, coating)

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Objective 2: Discuss rice-fortification efforts in other countries

Comparison

	Colombia	Brazil	Costa Rica
Legislation	Voluntary	Voluntary	Mandatory
Public-sector engagement	X	No	XXX
Private-sector led	XXX	XXX	No
Coverage	~35%	~4%	~100%
Impact on public health	?	?	XXX

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Summary

- Costa Rican experience suggests that mandatory fortification can attain universal coverage and public health impact
- Colombia and Brazil experiences suggest that private sector driven, voluntary fortification does not achieve high coverage and impact

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Objective 3: Offer recommendations to Colombian policy-makers in rice fortification

Recommendations

- Investigate spray technology for rinse resistance and nutrient retention during cooking
- Develop standards for rice fortification
- Consider a mandate with special consideration for small mills
- Strengthen capacity for enforcing food and border regulations
- Expand access to fortified rice by vulnerable populations through social safety nets

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Investigate spraying technology for rinse resistance & nutrient retention during cooking

Assessment by government laboratory or reputable third-party institution

If spraying technology is ineffective: substantially enhance it or replace it with extrusion or coating

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Develop standards for rice fortification

Currently, rice producers add types and amounts of micronutrients at will for marketing purposes

Setting standards will ensure that rice fortification is safe and beneficial to consumers

To establish rice standards, analysis of the estimated levels of micronutrients contributed by both fortified wheat flour and rice is necessary

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Consider a mandate with special consideration for small mills

If mandatory fortification is established, explore options to enhance small mills' ability to fortify

Government should weigh the resources required to regulate and monitor implementation by mills, and small mills in particular

To reach populations that depend on rice from small mills it may be necessary to implement other public health strategies to improve micronutrient status

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Strengthen capacity for enforcing food & border regulations

Improved enforcement and policies to deal with rice smuggling would improve the enabling environment for greater investment by local millers in rice fortification

http://www.elcomercio.com/files/article_main//files/crop/uploads/2014/09/14/5415f1e...385.jpg

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Expand access to fortified rice by vulnerable populations through social safety nets

Vulnerable populations in social safety net programs could benefit from consuming fortified rice

Social safety net programs can make fortified rice a requirement in their procurement

Large-volume purchases could give the national government added leverage in implementing fortification policies and standards

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Summary

- Public sector can strengthen the public health impact of rice fortification through several actions

https://www.tuseguro.com/co/images/images/Noticias/Tendencias201408ComoEsLaRegulacionParaMicrosegurosDeColombia.png

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Main messages

1. Rice is a suitable food to fortify to increase micronutrient intakes in Colombia
2. ~35% of Colombia's rice is voluntarily fortified with a spraying technology with unknown nutrient retention, stability & effectiveness
3. Several factors keep millers from adopting proven rice fortification technology
4. Costa Rican experience suggests that mandatory fortification can attain universal coverage and public health impact
5. Public sector can strengthen the public health impact of rice fortification through several actions

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The views expressed herein are solely those of the authors and do not necessarily reflect the views of the Foundation

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For more information

- Food Fortification Initiative
  - Becky Tsang: becky.tsang@ffinetwork.org
  - Peiman Milani, PATH, pmilani@path.org