Delivery options and actions to drive rice fortification through social programmes

India and Bangladesh
Katrien Ghoos
Rizwan Yusufali
Bangladesh – aims to become middle income country !!!!

Significant progress:

- Sustained economic growth in the order of 6%
- Poverty and food insecurity continue to decrease steadily
- Steady increase in per capita income at USD 1,314
- The Government is able to increase its allocation in FY 2015-2016 for social safety nets (SSN) - US$3 billion; 2.3% of GDP; 12% of Government expenditures
  - Food based – US$ 1.6 billion (60%)
  - Cash based – US$ 1.1 billion (40%)

Bangladesh reduced poverty; achieved MDG-2 Goal even earlier BUT;

- Prevalence of micronutrient deficiencies remains a major problem
## Bangladesh National Nutrition Status

### TRENDS IN NUTRITIONAL STATUS OF CHILDREN UNDER AGE 5, 2004-2014*

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Stunting (height-for-age)</th>
<th>Wasting (weight-for-height)</th>
<th>Underweight (weight-for-age)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004 BDHS</td>
<td>51</td>
<td>15</td>
<td>43</td>
</tr>
<tr>
<td>2007 BDHS</td>
<td>43</td>
<td>17</td>
<td>41</td>
</tr>
<tr>
<td>2011 BDHS</td>
<td>41</td>
<td>16</td>
<td>36</td>
</tr>
<tr>
<td>2014 BDHS</td>
<td>36</td>
<td>14</td>
<td>33</td>
</tr>
</tbody>
</table>

* Bangladesh Demographic and Health Survey 2014

### AGE GROUP

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Anemia Rate*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-school children <em>(children under 5)</em></td>
<td>33.1%</td>
</tr>
<tr>
<td>School children <em>(6-11 years)</em></td>
<td>19.1%</td>
</tr>
<tr>
<td>School children <em>(12-14 years)</em></td>
<td>17.1%</td>
</tr>
<tr>
<td>Non pregnant and Non lactating *(NPNL) <em>(15-49 years)</em></td>
<td>26%</td>
</tr>
</tbody>
</table>

* National Micronutrients Status Survey, 2011-12
The Government strategy includes food fortification

- **FOOD SUPPLEMENTATION**
- **FOOD FORTIFICATION** *(includes Rice Fortification)*
- **DIETARY DIVERSIFICATION**
Dietary diversity is limited - Rice Consumption in Grams Per Capita Per Day (HIES 2010)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>National</td>
<td>416 grams</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>344.2 grams</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>441.6 grams</td>
<td></td>
</tr>
</tbody>
</table>

- *Rice is the staple food for Bangladesh*
- *Bangladesh ranks 4th on worldwide rice consumption in 2014/15*
- *Bangladesh consumes more than 35.3 million metric tons of rice every year*
Scaling Up Rice Fortification in Bangladesh

Initiative Overview

- Government Safety Nets
- Market demand
- WFP assisted programmes
- Production capacity
- Garment factories
- Blending capacity

Six outcomes

Mainstreaming Gender
Scaling Up Fortified Rice in Bangladesh

The initiative involves Multi Stakeholder Engagement
Scaling Up Fortified Rice in Bangladesh

The implementation requires creating evidence and learning

**Acceptability trial**
- Provided evidence on acceptance by the beneficiaries – served as the basis

**Assessment at Garment Factory**
- Health and nutrition benefits
- Women Empowerment
- Increase productivity

**Effectiveness study**
- Improve micronutrient status among poorest group
- Improve women empowerment
- Improve programme efficiency

**Expected Outcomes**
- The evidence will be presented to encourage distribution of fortified rice subsidy for garment producers
- Expansion and scaling up based on the learning and evidence
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Implementation and expansion

a) Implementation arrangements and guidelines

- Formed expert group from various government ministries
- Organized inter-ministerial meeting to agree on basic principles and coordination
- Prepare necessary guidelines, issuance of Government circulars
- Prepared training/advocacy materials endorsed by National level committee
- Organized training and orientation sessions
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Implementation and expansion

b) Established new supply chain management under Government Safety Nets

Supply Chain Management for fortified rice under GoB Safety Net Programme

Existing System

- Rice Millers supply rice under the existing Internal Procurement policy of DGF
- Rice Miller lifts the allocated quantity of rice from Upazila LSD, carries to the Rice Mill for blending
- Rice Mill blends the lifted rice with RPK and packages it according to ration size
- Rice Mill carries packaged fortified rice to Union Parishad and delivers to the respective Chairman

Proposed System

- Ministry of Food
  - Internal Procurement process includes allocation of rice for the identified rice millers for rice fortification
  - Allocate rice quota through DCF(s) of the selected district(s). Inspection to be conducted by the Technical Inspectors (TI).
- DG Food
  - Directorate General of food makes the rice premix kernels available at a central location for the selected millers
  - Mixing is done in the milling process according to allocation. Rice is packaged as per standard ration size in specified bags.
- Rice Millers
  - Contracted Rice Millers supply fortified rice directly to LSDs/CSDs
- LSDs and CSDs
  - Chairperson of the UPs will receive fortified rice from LSDs for distribution for VGD as per approved allocation.
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Implementation and expansion

c) Adoption of Standards – essential to assist private partners in marketing fortified rice

The composition approved for Bangladesh (determined based on the needs). This composition was agreed in a series of consultations (Government agencies, research agencies, nutrition working groups, consumers’ association, etc.)

<table>
<thead>
<tr>
<th>Nutrient Unit</th>
<th>Rice consumption of 150-300 g/cap/d, in ppm (mg/kg)</th>
<th>Targeted amount in 100 g uncooked rice</th>
<th>Target fortification level, including 30% overage for vitamins to compensate</th>
<th>Target range ex-factory</th>
<th>Expected range at household level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A (Palmitate)</td>
<td>1.5</td>
<td>150 mcg (=RE)</td>
<td>195 mcg</td>
<td>185-215</td>
<td>150 - 215</td>
</tr>
<tr>
<td>Vitamin B₁ (as Thiamin mononitrate)</td>
<td>4</td>
<td>0.4 mg</td>
<td>0.52 mg</td>
<td>0.45-0.60</td>
<td>0.40 – 0.60</td>
</tr>
<tr>
<td>Vitamin B₁₂ (Cyanocobalamine)</td>
<td>0.01</td>
<td>1 mcg</td>
<td>1.3 mcg</td>
<td>1.15-1.45</td>
<td>1.00 – 1.45</td>
</tr>
<tr>
<td>Folic Acid (vitamin B₉)</td>
<td>1.3</td>
<td>130 mcg</td>
<td>170 mcg</td>
<td>150-190</td>
<td>130 - 190</td>
</tr>
<tr>
<td>Iron (Ferric pyrophosphate)</td>
<td>60</td>
<td>6 mg</td>
<td>6 mg</td>
<td>5.0-7.0</td>
<td>5.0-7.0</td>
</tr>
<tr>
<td>Zinc (as Zinc oxide)</td>
<td>40</td>
<td>4 mg</td>
<td>4 mg</td>
<td>3.5 – 4.5</td>
<td>3.5 – 4.5</td>
</tr>
</tbody>
</table>
Implementation and expansion

d) Locally designed blending units

- Developed by local engineering firms
- Low cost – USD 12,000
- Affordable to local traders/millers
- Able to blend fortified rice kernels with milled rice at a ratio of 1:100
- Capacity to mix 2.5mt/hour & 500mt/month approximately
- Continuous blending
Implementation and expansion

e) Quality control of blending fortified rice kernels with milled rice

- Calculation procedure to determine fortified rice kernel per gram
  - i. Kernel/gram = (number of kernels)/(weight of sample in gram)
  - ii. Estimated CV = 0.5%

- Calculation of mixing quality (even distribution)
  - i. Standard deviation
  - ii. Coefficient of Variation (CV)

- Acceptable deviation
  - i. Maximum deviation from the target value is +20% for a single measurement
  - ii. For multiple measurements (mean of 5), the maximum deviation is +15%
  - iii. Coefficient Variation (CV) of 5 measurements should be < 14%
  - iv. CV of very homogeneous mixture would be < 5%

- Toolkits
  - i. UV Lamp or Money Tester
  - ii. Pocket Balance 100g
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Implementation and expansion

f) Local production of fortified rice kernels - US$100,000

- Interested private partners
- Existing quality assurances practices
- Invested on business model
- Installed extrusion technology (twin screw)
- Final product passes through metal detector
- Produces 1000kg/day
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Implementation and expansion

g) Expansion

- Mainstreaming distribution of fortified rice in Government Social Safety Nets
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Implementation and expansion

g) Expansion

- Allocated government funding
- Set up framework of agreement to contract private millers for blending
- Purchase of fortified rice kernels locally from private company
- Improved monitoring oversight
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Key success factors

- Multi-sector approach engaging public and private sector partners
  - Government leadership and collaboration across multiple government departments
  - Involvement of the private sector

- Working in partnership with development partners

- Technical assistance from WFP and DSM

- Addressing commercial sustainability for fortified rice private sector engagement

- Local production of fortified rice kernels
Way Forward

- The Government has decided to scale up of rice fortification in its programmes/interventions

- The Government is putting in place the necessary measures such as guidelines/standards/contracting arrangements

- Plan to invest to improved infrastructure - building storage capacitates up to 500,000mt of fortified rice in the Government Storage Depots

- Plan to make fortified rice available in the market
Challenges

- Cost! International import versus local production of fortified rice kernels by the private sector remains a key challenge

- Marketing the product for poor in remote areas

- Improved quality assurance practices (discussion ongoing with relevant agencies)

- Lab facilities, protocols, technical knowledge
Need for fortifying rice in India:

About 65% of India’s population consumes rice as a staple.

Rice is a large source of calories and core component of agriculture and nutrition in most of India though low in micronutrients.

Milling of rice removes the fat and micronutrient rich bran layers to produce the commonly consumed starch white rice.

Polishing further removes 75-90% of vit. B1, vit. B6, vit. E and Niacin.

Fortifying rice provides an opportunity to add back the lost micronutrients but to also add others such as iron, zinc, folic acid, vit. B12 and vit. A.
Status check on rice fortification in India

- Policy on mandatory food fortification being drafted - rice included in policy as a vehicle for delivery of micronutrients.
- Draft standards for fortified rice developed by the Food Safety Standards Authority of India.
- Large scale rice fortification initiatives in the school feeding programme in the states of Odisha and Karnataka. Pilot on rice fortification in the state of Tamil Nadu in another government food safety net.
- Keen interest in the other states.
- Local production capacities for fortified rice kernels.
Social safety net schemes in India

**Targeted public distribution system**
- Household rations distributed to priority households belonging to antodaya anna yojana.
- Ration includes wheat, rice and coarse cereals.

**Mid day meal scheme**
- School going children between 6 to 14 years of age.
- 450 kcal and 12 gm proteins to primary school children.
- 700 kcal and 20 gm proteins to upper primary school children.

**Integrated Child Development Services scheme**
- Children till 6 years of age; pregnant; lactating women.
- 500 kcal and 12-15 gm proteins to children between 6-72 months.
- 800 kcal and 20-25 gm proteins to pregnant/lactating women.

In 2013-'14, approx. 24.5 million tonnes of rice was lifted out of a 44.5 million metric tonnes of grain (both rice and wheat) lifted.

In 2014-'15, 2 million metric tonnes of rice was lifted out of a total of 2.37 million metric tonnes of grains lifted.
India summary of evidence and studies on rice fortification (N=4)

<table>
<thead>
<tr>
<th>Type of Research</th>
<th>Research Organization</th>
<th>Country/ Year</th>
<th>Study Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficacy</td>
<td>National Institute of Nutrition, Indian Council of Medical Research, Hyderabad, India</td>
<td>India 2007-2008</td>
<td>To assess the impact of consuming rice fortified with iron, Ultra Rice, on the iron status of children in a mid-day meal program in India.</td>
</tr>
<tr>
<td>Efficacy</td>
<td>Division of Nutrition, St. John’s Research Institute, St. John’s National Academy of Health Sciences, Bangalore, India.</td>
<td>India 2009-2010</td>
<td>To study the efficacy of rice-based lunch meals fortified with multiple micronutrients, including vitamin A, thiamine, niacin, vitamin B-6, vitamin B-12, folic acid, and zinc, in combination with high or low concentrations of iron on anemia, micronutrient status, and the physical and cognitive performance of Indian schoolchildren.</td>
</tr>
<tr>
<td>Type of Research</td>
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<td>Study Objectives</td>
</tr>
<tr>
<td>---------------------------</td>
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<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Acceptability, Sensory</td>
<td>National Institute of Nutrition, Indian Council of Medical Research, Hyderabad, India</td>
<td>India/2006</td>
<td>To test the organoleptic properties of rice fortified with iron Ultra Rice.</td>
</tr>
<tr>
<td>Acceptability, Sensory</td>
<td>Indian Market Research Bureau International (IMRB), New Delhi, India</td>
<td>India 2003</td>
<td>To gauge the organoleptic acceptance of Ultra Rice fortified with ferrous sulfate and the sensitivity of potential target segments.</td>
</tr>
</tbody>
</table>
## Initiatives on introducing fortified rice through the public sector schemes in India

<table>
<thead>
<tr>
<th>Geography</th>
<th>Project period</th>
<th>Beneficiary type</th>
<th>Quantity of fortified rice distributed</th>
<th>Beneficiary numbers</th>
<th>Implementing agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>2008-10</td>
<td>Mid-day meal scheme (6 - 14 yr. old)</td>
<td>1000MT</td>
<td>60,000</td>
<td>Naandi foundation</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>2011</td>
<td>Mid-day meal scheme (6 - 14 yr. old)</td>
<td>3300 MTs</td>
<td>185,000</td>
<td>Akshay Ptra Foundation</td>
</tr>
</tbody>
</table>
Role of WFP in furthering the agenda of rice fortification in India

- Demonstrating to the government that implementation of rice fortification at scale over a substantial duration was possible through government platforms.

- Supporting the government in sustaining rice fortification and taking it to scale in a phased manner.

- Contributing to existing evidence base on rice fortification.

- Policy advocacy with both relevant departments and ministries at both National and State level on need for mainstreaming rice fortification into existing government policies, programmes and plans.

- Technical assistance to the government towards policy formulation.
WFP Rice Fortification Project at a glance in Odisha

**Goal:** Operationalizing rice fortification through the platform of the mid-day meal

**Modality:** Fortification of FCI rice at a centralized location and its distribution and consumption in the MDM across schools in Gajapati.

**Coverage:** 99,231 school children across 1473 schools in Gajapati

**Duration:** 40 months (duration of intervention is 31 months)

**Results:** (i) Fortification of rice taken over by the government and being sustained at their own cost (ii) Commitment from GoO to scale up rice fortification to other districts in a phased manner (iii) Anemia prevalence reduced by 20%age points in the given district of which 6% age point reduction was attributable to fortified rice
Lesson’s learnt

**What helped? What worked well?**

- Domestic production capacity for Fortified Rice Kernels
- In-country evidence base on fortified rice
- Operationalizing delivery of fortified rice in partnership with the government.
- Systematic approach to implementation.
- Instituting a mechanism of a technical advisory group consisting of government, research institutes and academia to periodically review the WFP pilot helped build confidence with the government.
- High level visibility and dissemination of the experience at various fora.
- Partnerships and coordination with other agencies.

**What did not help? What could be improved?**

- Limited Fortified Rice Kernels production capacity in the country.
- Undue focus on evaluation of the impact of the intervention though the overall goal of the intervention was operationalization.
- Difficulty in demonstrating impact in real time field conditions.
- Incremental cost
- Long term sustainability.
Gracias!

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