Agriculture Interventions

Erick Boy
HarvestPlus / International Food Policy Research Institute

HarvestPlus c/o IFPRI
2033 K Street, NW • Washington, DC 20006-1002 USA
Tel: 202-862-5600 • Fax: 202-467-4439
HarvestPlus@cgiar.org • www.HarvestPlus.org
Framework of Agriculture Interventions

- **Women’s control over resources**
- **Source of income**
- **Food prices**

**Technology adoption**
- Participation in the program (access, utilization)
- Women’s own nutrition & health

**Household income**
- Diet composition
- Source of Food

**Food Expenditure**
- Non-food spending

**Caloric, protein, micronutrient intake, absorption & utilization**
- Nutritional status

**Women’s time & caring practices**

Anemia: Can agriculture do more?

• **Agriculture-Associated Diseases: Adapting Agriculture to Improve Human Health**

• **Addressing the Links among Agriculture, Malaria, and development**

• **Biofortification: Leveraging Agriculture to Reduce Hidden Hunger**

Can plant foods provide the iron?

- Biofortified pearl millet (*glaucum*)
- Biofortified beans (*P. vulgaris*)
- Biofortified rice (*G. max*)
Male & female children 6-12 years old living in 20 boarding schools-Oaxaca

High Iron – 263 subjects
Control – 305 subjects
Randomization by school

18% anemia
11% iron deficiency

Mealtime with black beans
Mexico
Bean Buffet
Rwanda

Adult female university students
18-27 years old
Living on campus of NUR
High Iron – 116 subjects
Control – 118 subjects
Randomization by individual
44% anemia
71% iron deficiency
Iron Intake from Beans Consumed (mg/day)

- **Rwanda**: 13.5 mg/day (High Iron) 6.75 mg/day (Control)
- **Mexico**: 4.66 mg/day (High Iron) 2.64 mg/day (Control)
Results from the Rwanda Bean Trial
Whole Sample (n=234)

- Hemoglobin (g/dL)
- Ferritin (µg/L)
- Transferrin receptor (mg/L)
- Body iron (mg/kg)

**Change in iron status (end line minus baseline)**

- **Hemoglobin (g/dL)**: p<0.10
- **Ferritin (µg/L)**: p<0.05
- **Transferrin receptor (mg/L)**: p<0.10
- **Body iron (mg/kg)**: p<0.05

**Legend:**
- Red: High Iron
- Blue: Control
Results from the Mexico Bean Trial
Selected schools based on low morbidity status (n=435)

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<thead>
<tr>
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<th>High Iron</th>
<th>Control</th>
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<td>Hemoglobin (g/dL)</td>
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Change in iron status (end line minus baseline)

- P > 0.05
- P < 0.05
Recap

• Agriculture: plants (non heme) and livestock (heme iron & enhancers)
• Evidence of the efficacy & effectiveness of targeted agricultural programs on maternal and child nutrition, with the exception of vitamin A, is limited
• Agriculture sector can do more to tackle
• Biofortification, an efficacious alternative
“Acceleration of progress in nutrition will require effective, large-scale nutrition-sensitive programmes that address key underlying determinants of nutrition and enhance the coverage and effectiveness of nutrition-specific interventions.”

Marie Ruel & Harold Halderman. The Lancet. Published Online June 6, 2013 http://dx.doi.org/10.1016/S0140-6736(13)60843-0

Biofortification of staple food crops is efficacious intervention to improve iron status.
Thank you