



# Seeds, Stems and Vines: Incorporating Biofortification Into A Project



SPRING

October 27, 2015

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# Micronutrient Deficiencies: 2 Billion People

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## Vitamin A deficiency

- Supplements reduced child **mortality** by 23%
- 375,000 children go blind each year; compromised immunity

## Iron deficiency

- **Impaired cognitive abilities** that cannot be reversed
- 82% of children < 2 years in India are anemic; anemia also contributes to maternal mortality

## Zinc deficiency

- increased **incidence/severity diarrhea/pneumonia; stunting**
- 2 billion people at risk; 450,000 deaths per year





# Biofortification - The Process

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- Constant process of crop breeding to improve yield and resistance to pests, diseases, climate
- Innovation for health: adding nutrition as a desirable breeding trait
- New varieties developed in CG centers, then transferred to countries
- National Agricultural Research Services (NARS) conduct
  - crossing/adaptive breeding
  - test for 2 to 3 years in different terrain, soil, climate





# Crops for Africa & Release Dates

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**2011**



**Cassava**

**Vitamin A**

Nigeria

DR Congo

**2012**



**Beans**

Iron (Zinc)

Rwanda

DR Congo

**2012**



**Maize**

**Vitamin A**

Nigeria

Zambia

Crops are high-yielding and with other traits farmers want.



# Crops for Asia & Release Dates

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**2012**



**Pearl Millet**

Iron (Zinc)

India

**2013**



**Rice**

Zinc

Bangladesh

India

**2013**



**Wheat**

Zinc

India

Pakistan

Crops are high-yielding and with other traits farmers want.



# Other Biofortified Crops

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## Potato

Iron



## Lentil

Iron, Zinc



## Sorghum

Iron, Zinc



## Banana/Plantain

Vitamin A



## Cowpea

Iron, Zinc





# Global Reach of Biofortification

**NUTRITIOUS STAPLE FOOD CROPS: WHO IS GROWING WHAT?** These crops have been conventionally bred to be rich in essential vitamins and minerals that are needed for good health.



Source: HarvestPlus. Copyright © 2010 HarvestPlus. Further information: [www.harvestplus.org](http://www.harvestplus.org)  
 HarvestPlus improves nutrition and public health by developing and promoting biofortified food crops that are rich in vitamins and minerals, and providing global leadership in biofortification research and technology. HarvestPlus is part of the CGIAR Research Program on Agriculture for Nutrition and Health (A4NH). A4NH is a global partnership research and knowledge for action program. It is funded by and linked to 15 research centers in 100+ countries and includes hundreds of partner organizations. The HarvestPlus program is coordinated by two of these centers, the International Center for Tropical Agriculture (CIAT) and the International Potato Research Institute (IPRI).



# Biofortification - the Evidence

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- Breeding increases nutrient levels without reducing yield
- Extra nutrients in crops improve micronutrient status
- Farmers are growing biofortified crops, and consumers are eating them
- Biofortification is cost-effective: central, one-time investment



# Iron Pearl Millet Reverses Iron Deficiency

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- Lack of iron impairs mental development and learning capacity, and increases weakness and fatigue.
- A new study found that iron pearl millet was able to **reverse** iron deficiency in children aged 12-16 years in India **within six months**.





# Vitamin A OSP Reduces Diarrhea

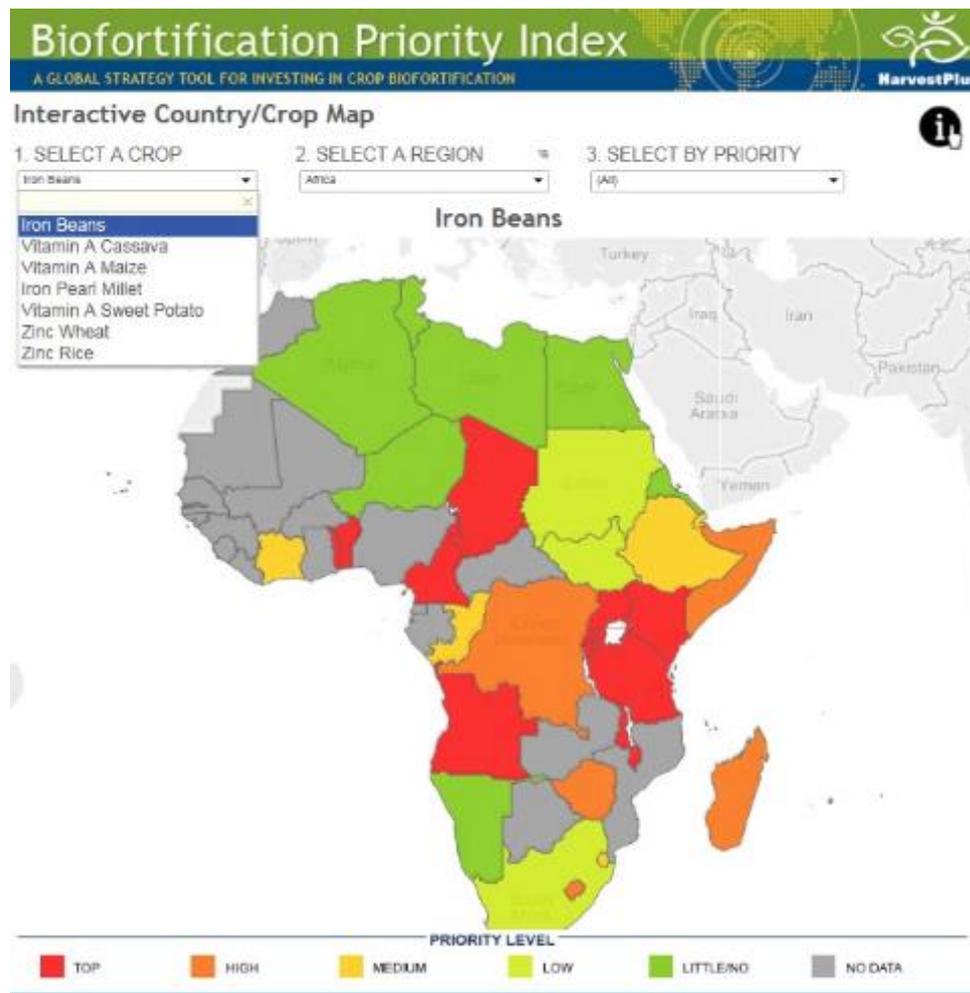
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- Diarrhea is one of the leading causes of death in children < 5 in developing countries.
- Eating orange sweet potato (OSP) reduces the incidence and duration of diarrhea in children.
  - **For children < 3** likelihood of developing diarrhea was **reduced by more than 50%** and duration of diarrhea reduced **by more than 25%**.
  - **For children < 5** likelihood of developing diarrhea was **reduced by more than 40%** and duration of diarrhea reduced **by more than 10%**.





# Which Nutrients, Crops, Countries?



<http://bit.ly/HPlusBPI>



# Frequently Asked Questions

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- Not genetically modified
- Can't "overdose"
- Supports, not undermines, biodiversity and dietary diversity; not just "making bad food better"
- Visible vs Invisible traits affecting consumer acceptance



# Actors

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International financial institutions

- World Bank
- IFAD

Multi-lateral agencies

- World Food Program
- Codex

Regional Frameworks

- African Union

National Governments

- Brazil
- China
- India

NGOs

- World Vision
- Land O'Lakes

Private Sector

- Nirmal Seed
- Zamseed



# Incorporating in Programming

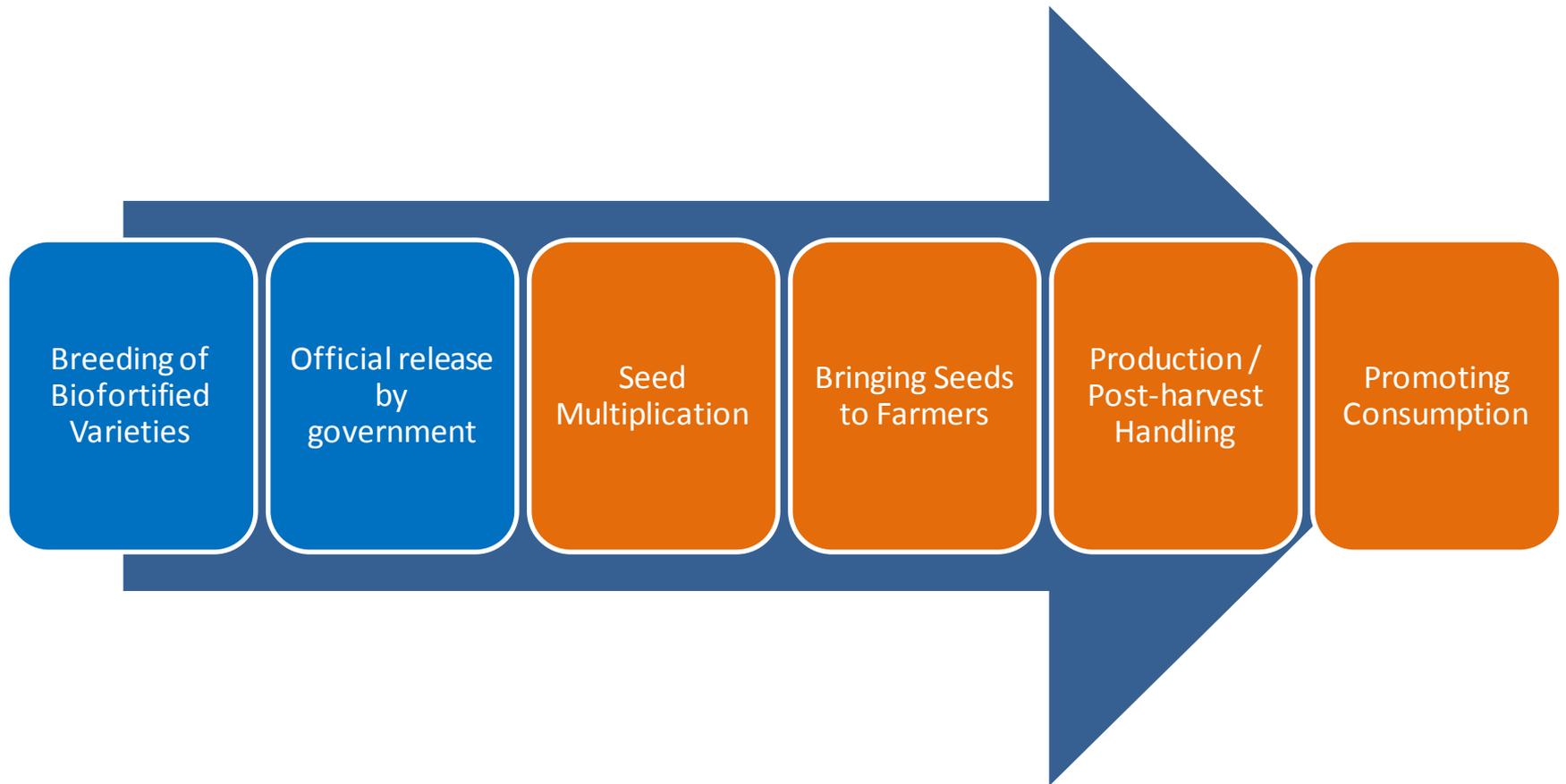
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# Breeding to Consumption

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# Seed Multiplication

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- NARS provide access to released seed / stems /vines for multiplication
- Multiplied and accessed through:
  - Seed companies
  - CBO / farmer groups
  - Government agencies





# Seed Quality Control

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- Capacity building needed with multipliers
- Different seed quality available
  - Quality declared seed
  - Certified seed





# Bringing Seeds to Farmers

- Delivered by commercial and non-commercial sources
  - Seed companies
  - Agrodealers
  - Farmer to farmer
  - Project / NGOs
  - Government systems





# Encouraging Production

- Creating demand for biofortified seeds with farmers
  - Extension staff training
  - Farmer training
  - Nutrition messaging integrated with agronomic and marketing messages / training





# Post-harvest and Processing

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- Training and capacity building of farmers and commercial entities
  - Post-harvest handling
  - Processing methods





# Linking to Markets

- Link to local market
- Link to institutional buyers
  - Schools
  - Hospitals
  - Prisons
- Food processors
- WFP – Purchase for Progress





# Promoting Consumption

- Innovative campaigns are needed to encourage both production and consumption by target community
- Many tested methods: radio dramas, print, community theatre, other media, consumer tasting / cooking demos



Consumer tasting sessions with Orange Sweet Potato in Uganda



HarvestPlus / Nollywood collaboration on Yellow Cassava in Nigeria



HarvestPlus joint roadshow with afroPop, rap, R&B musicians to promote iron beans in Rwanda



# Farm Radio International

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# ICT for Agriculture

- Linking farmers to seed
  - Beep2Seed
- TRAC FM – real time consumer feedback

Which single crop would you suggest Florence to grow?

**NOTES for presenter - in English, please read through and translate. Make sure instructions are clear**

## Before the drama

Briefly recap on the previous episode and repeat the previous question and results of the poll

91 % voted for Florence,

9 % voted for Roland

Now lets see if Roland is properly caring for his family..

mention that we will listen to a new episode where the story continues and that there will be a new poll question to which people can respond for FREE! This time, even a price will be given to some of the participants (airtime).

## AFTER THE EPISODE

Briefly discuss what happened during episode 2 especially going into the second part where it is suggested that Florence should provide a nutritious diet to her children. Bridge this to the following question:

### Question

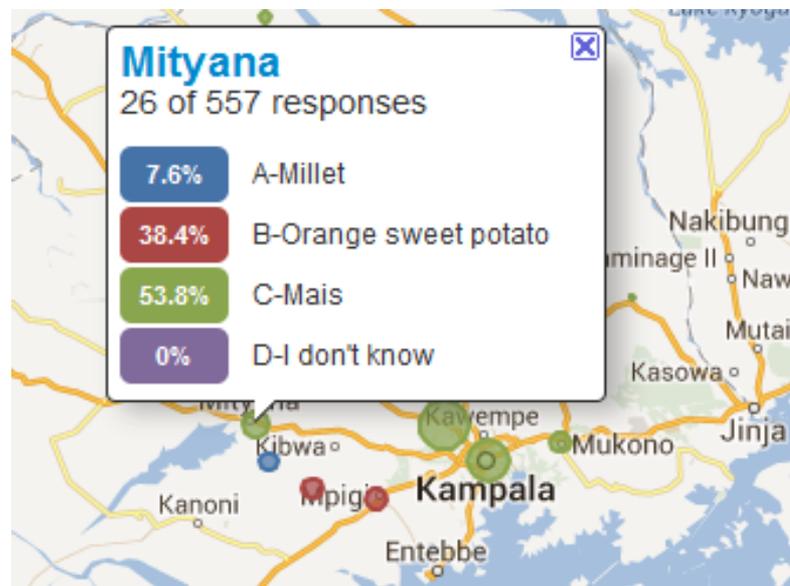
Since Florence cannot buy all the necessary nutritious foods to provide a healthy meal (diet) for her children, which single crop would you suggest her to grow?

A: Millet

B: Orange sweet potato

C: Mais

D: I don't know





# Improved Agricultural Technology

- Labor saving devices – stem cutter / wheelbarrow (cassava)
- Clean tissue culture (orange sweet potato)





# Improved Agricultural Technology

- Roaster (cassava)
- Affordable extruders for food processing
- Seed swap
- Electronic market/database (cassava)
- Moisture meters





# Implementation - the Road Ahead

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- Private sector investments in plant breeding and seed marketing of a range of biofortified products with standards/quality control
- Mainstreaming of biofortification by
  - public sector agricultural research
  - NGOs and multi-lateral institutions
- Advocacy and other support by national governments and regional organizations
- Creating consumer demand (advertising, governments, NGOs)
- Generating evidence/experience, then sharing this information across countries and regions



# Thank You!

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