



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa



AFRICAN DEVELOPMENT BANK GROUP
GROUPE DE LA BANQUE AFRICAINE
DE DEVELOPPEMENT





OUTLINE

1

Introduction

2

Biofortification

3

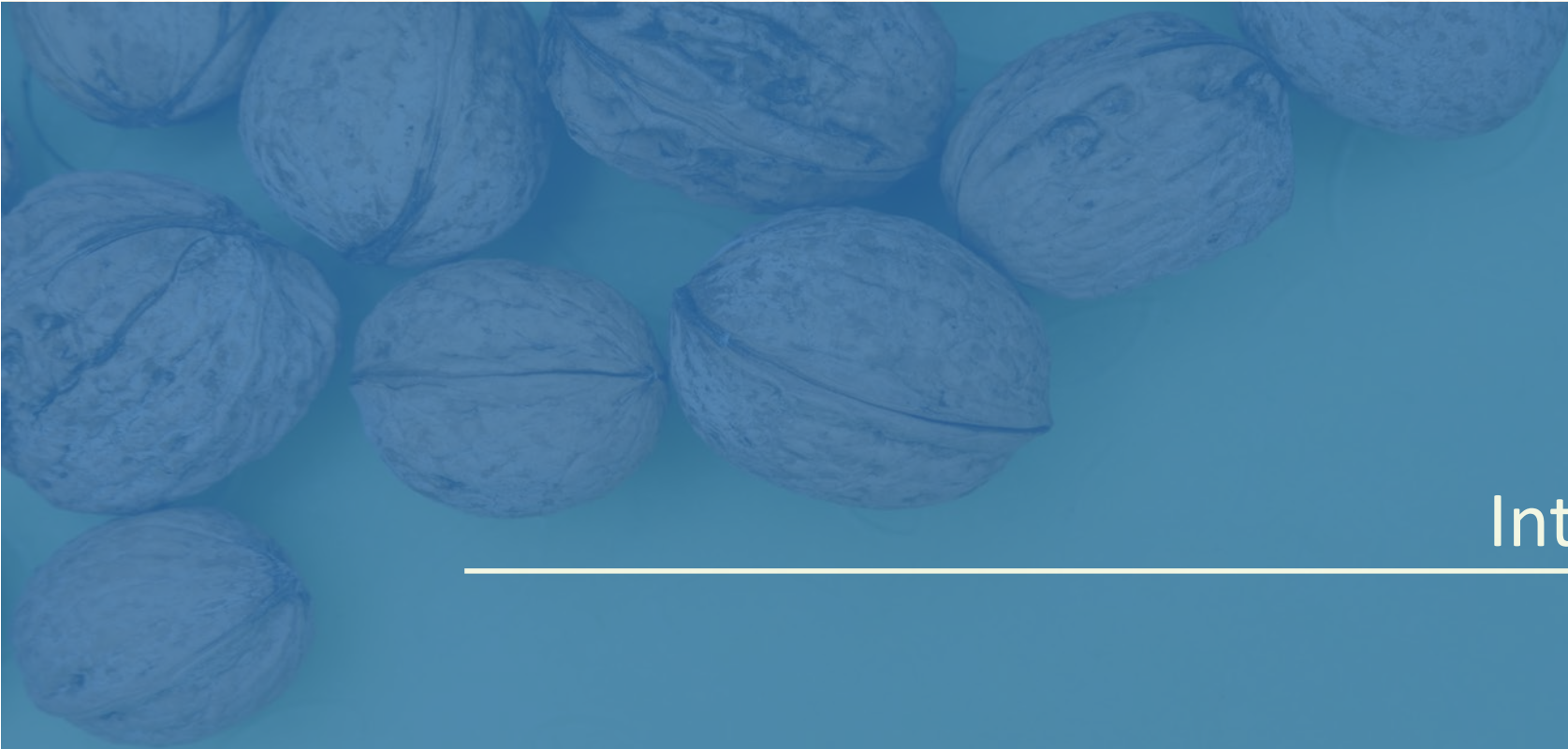
Food fortification

4

Q&A Session

5

Closing



Introduction

Opening Remarks- Dr. Martin Fregene



Director, Agriculture and
Agro-Industry at the African
Development Bank



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Please click on the link in the chat box for Mentimeter

What is your understanding of biofortification?

How many countries in West Africa have released biofortified crop varieties for use by farmers?



The background of the slide is a photograph of sorghum plants, showing their characteristic long, cylindrical seed heads and broad green leaves. The entire image is covered with a semi-transparent blue filter. The word "Biofortification" is written in a white, sans-serif font on the right side of the image. A thin white horizontal line is positioned below the text.

Biofortification

Speaker- Dr. Howarth Bouis



ALN Champion, founder of HarvestPlus and 2016 World Food Prize Laureate



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Linking Agriculture and Nutrition: An Overview of Biofortification and HarvestPlus

Howarth Bouis

Emeritus Fellow

International Food Policy Research Institute

September 15, 2021



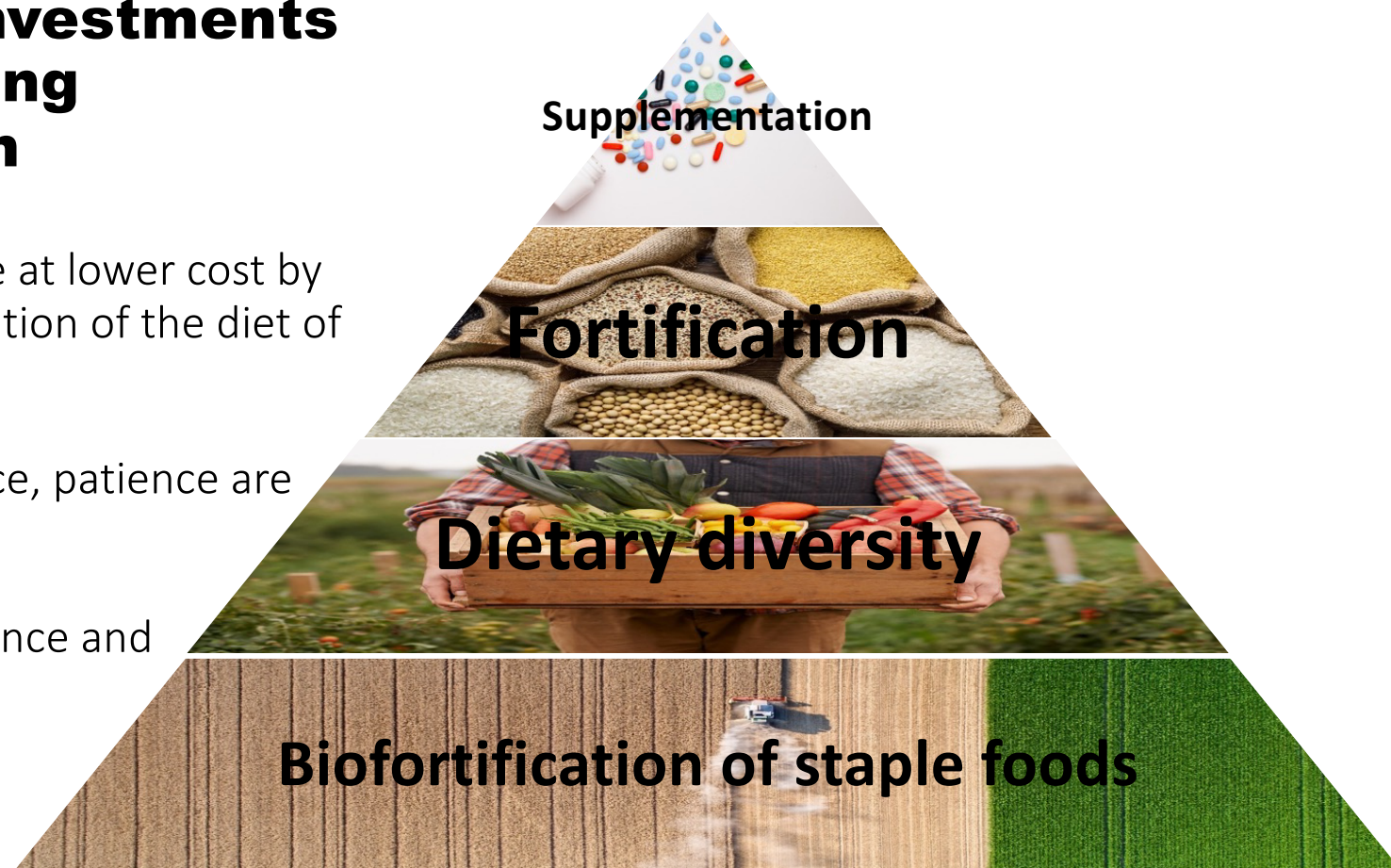
Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Layers of investments in overcoming malnutrition

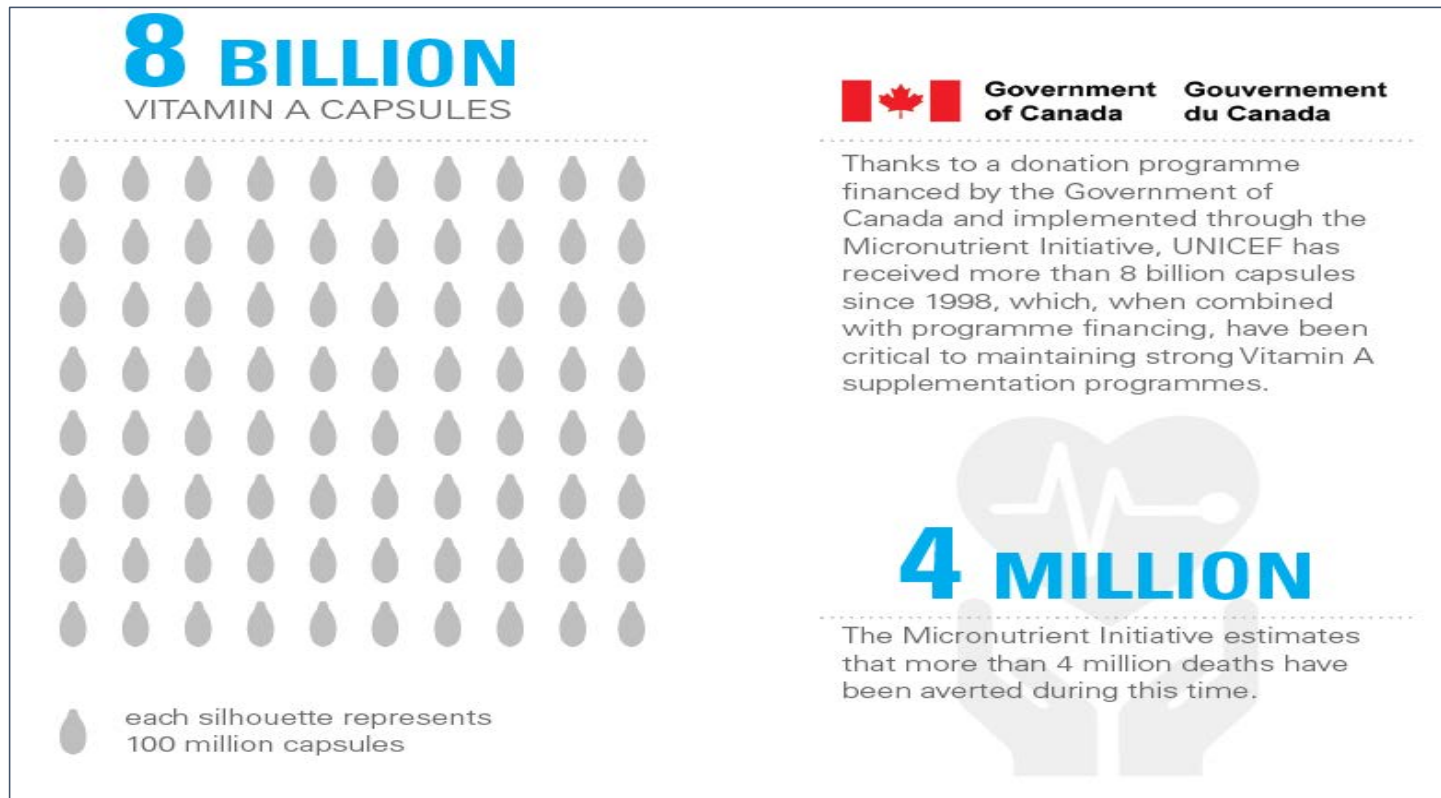
Reach more people at lower cost by tackling the foundation of the diet of everyone.

Vision, perseverance, patience are required.

The payoff is resilience and sustainability



Excerpt From Recent UNICEF Brochure

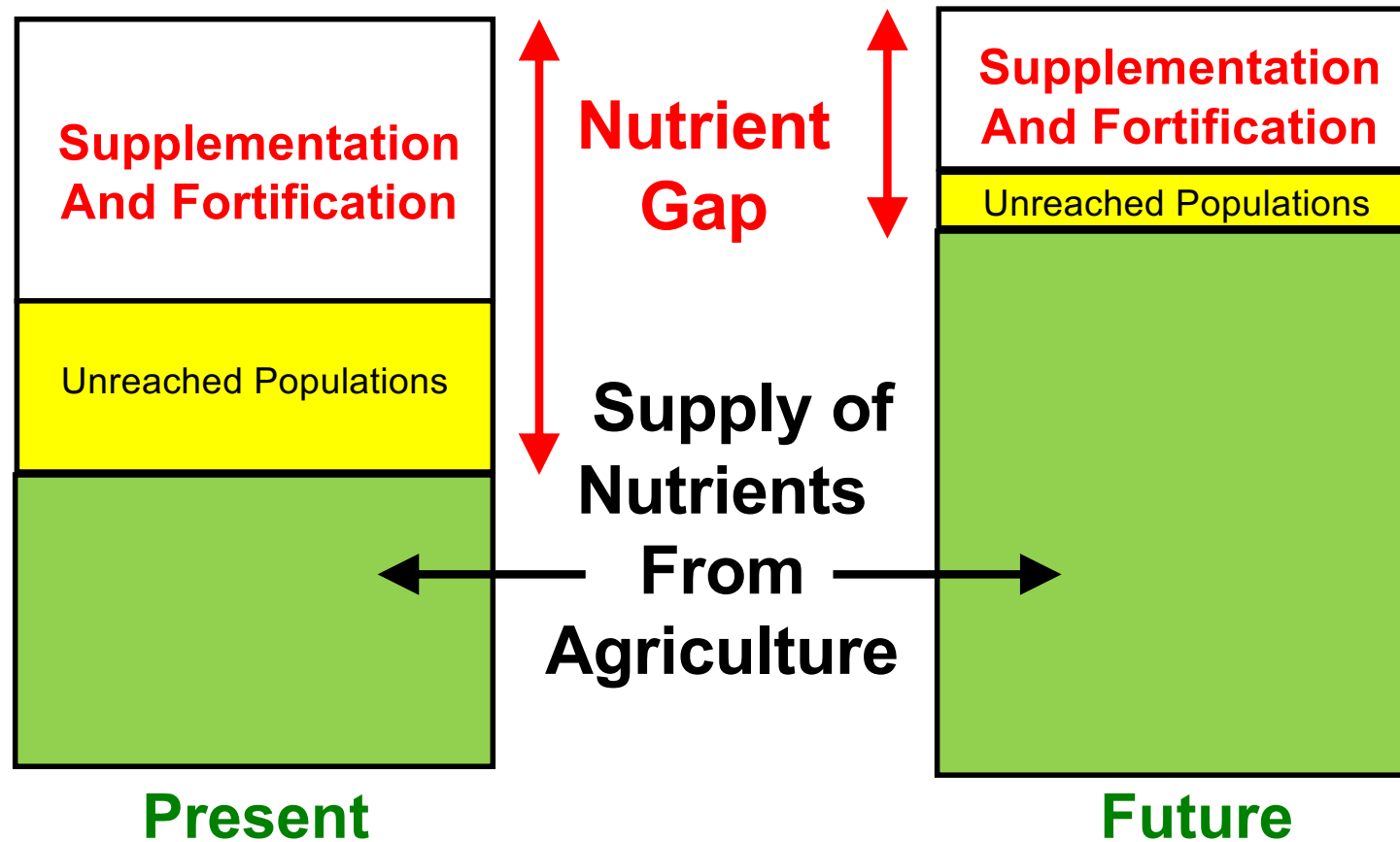


Cost Per Vitamin A Capsule: \$US 1-2

Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa



A Primary Role of Agriculture Is To Provide Nutrients for Healthy Populations



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Nutrition-Smart Agricultural Strategies

- **Food Staples** – Increase **Density** of Nutrients
 - Biofortification
 - Fertilizers and sprays
 - No extra cost to consumers
- **Non-Staple Foods** – Increase **Quantities**
 - Milk, Eggs, Small Fish, Specific Green Leafy Vegetables
 - Home gardens, hybrid seeds (multiple nutritious foods)
 - Requires higher incomes and/or lower food prices



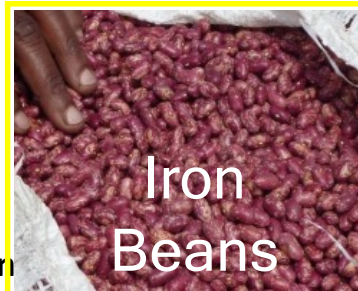
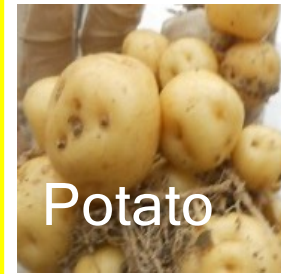
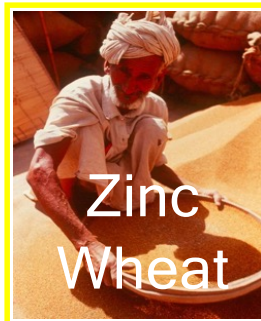
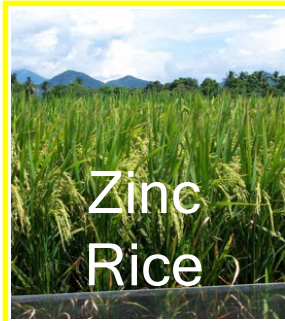
Percent Contribution of **Rice**
to Nutrient Intakes in the Philippines, 2015

Nutrient	Percent Contribution	Nutrient	Percent Contribution
Energy	59%	Protein	40%
Carbohydrates	76%	10 of 11 Amino Acids	30-40%
Calcium	20%	Vitamin A	0%
Copper	32%	Vitamin C	0%
Iron	33%	Thiamine (B1)	39%
Magnesium	38%	Riboflavin (B2)	20%
Manganese	53%	Niacin (B3)	45%
Phosphorous	33%	Vitamin B5	57%
Potassium	15%	Vitamin B6	32%
Zinc	41%	Folate (B9)	10%



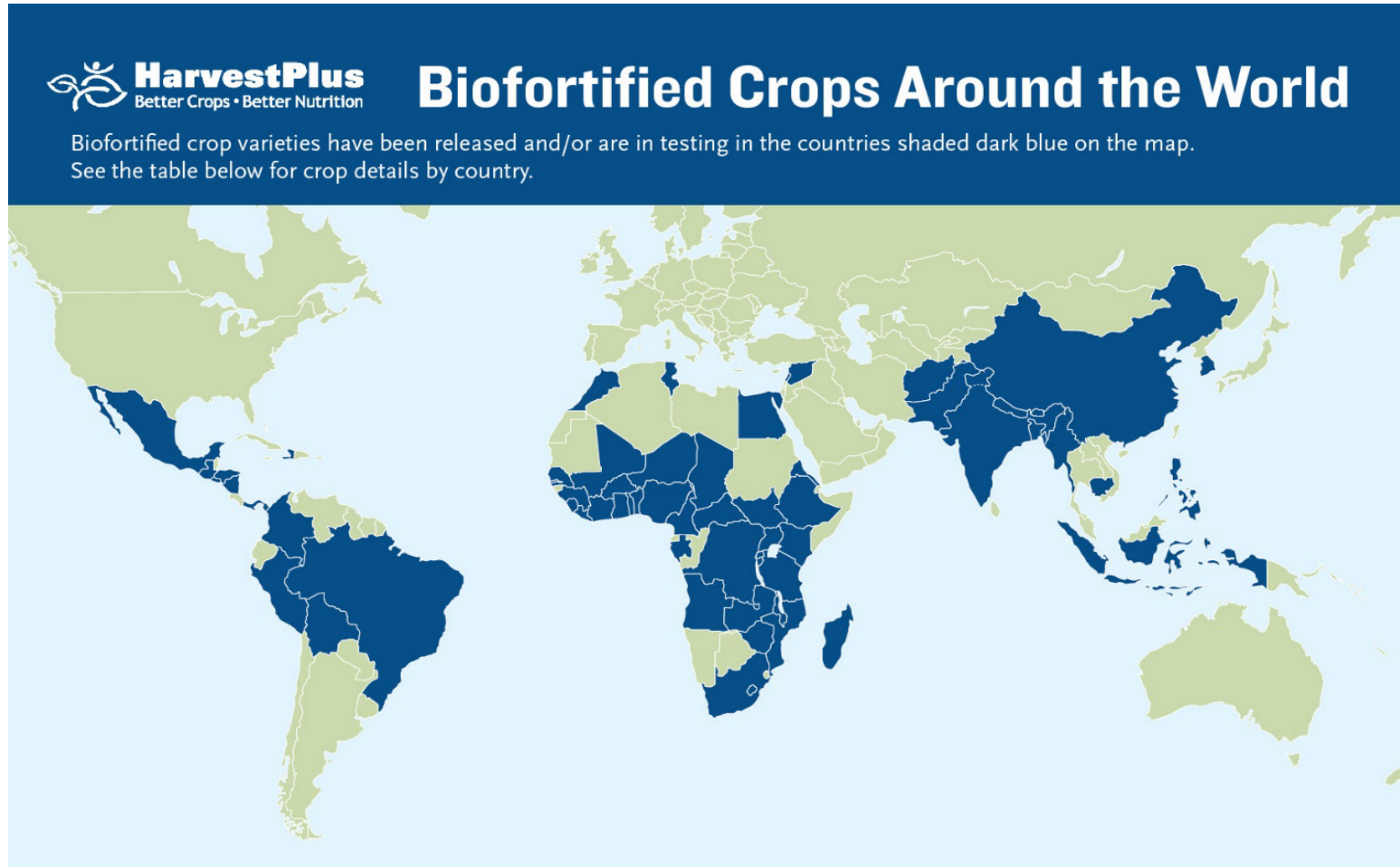
Biofortified crops released in **40 countries**

Testing for releases in these and another **20+ countries**



Bioforti

Breeding and Crop Release



Breeding and Crop Release

Biofortified Crop Varieties Released (R) or in Testing (T) by Country

Africa	HIB	IPM	ZIM	ZIR	ZIW	ABP	VAC	VAM	OSP	IZC	IZP	IZL	ZIS
Angola								T	R				
Benin Rep		T					T	T					
Burkina Faso		T						T	R				
Burundi	R					R			R				
Cameroon						T	R	R					
Central African Rep						T							
Chad						T							
Côte d'Ivoire						T	T		R				
DR Congo	R					R	R	R					
Egypt				T				T					
Eritrea		T						T					
Ethiopia			T	T		T	T	R			T	R	
Gabon						T							
Gambia		T				T							
Ghana		T				R	R	R					
Guinea						T	T						
Kenya	T	T				T	T	R			T		
Liberia						T	T						
Madagascar		T		T				R					
Malawi	T	T				T	R	R					
Mali		T					R	T					T
Morocco								T				T	
Mozambique						T	T	R					
Niger		R				T	T	T					
Nigeria		T	T			T	R	R	R	T			T
Rwanda	R					T		R	R		T		
Senegal		T		T		T	T	T					
Sierra Leone						R							
South Africa							T	R					
South Sudan		T					T	T					T
Swaziland						T							
Tanzania	R	T				T	T	R	R				
Togo		T						T					
Tunisia		T											
Uganda	R	T				T	T	T	R		T		T
Zambia		T		T		T	R	R					
Zimbabwe	R	T		T			R	T					

HIB = Iron Beans
 IPM = Iron Pearl Millet
 ZIM = Zinc Maize
 ZIR = Zinc Rice
 ZIW = Zinc Wheat
 ABP = Vit. A Banana/Plantain
 VAC = Vit. A Cassava
 VAM = Vit. A Maize
 OSP = Vit. A Orange Sweet Potato
 IZC = Iron/Zinc Cowpea
 IZP = Iron/Zinc Irish Potato
 IZL = Iron/Zinc Lentils
 ZIS = Zinc/Iron Sorghum

Source: HarvestPlus, International Potato Center (2019)

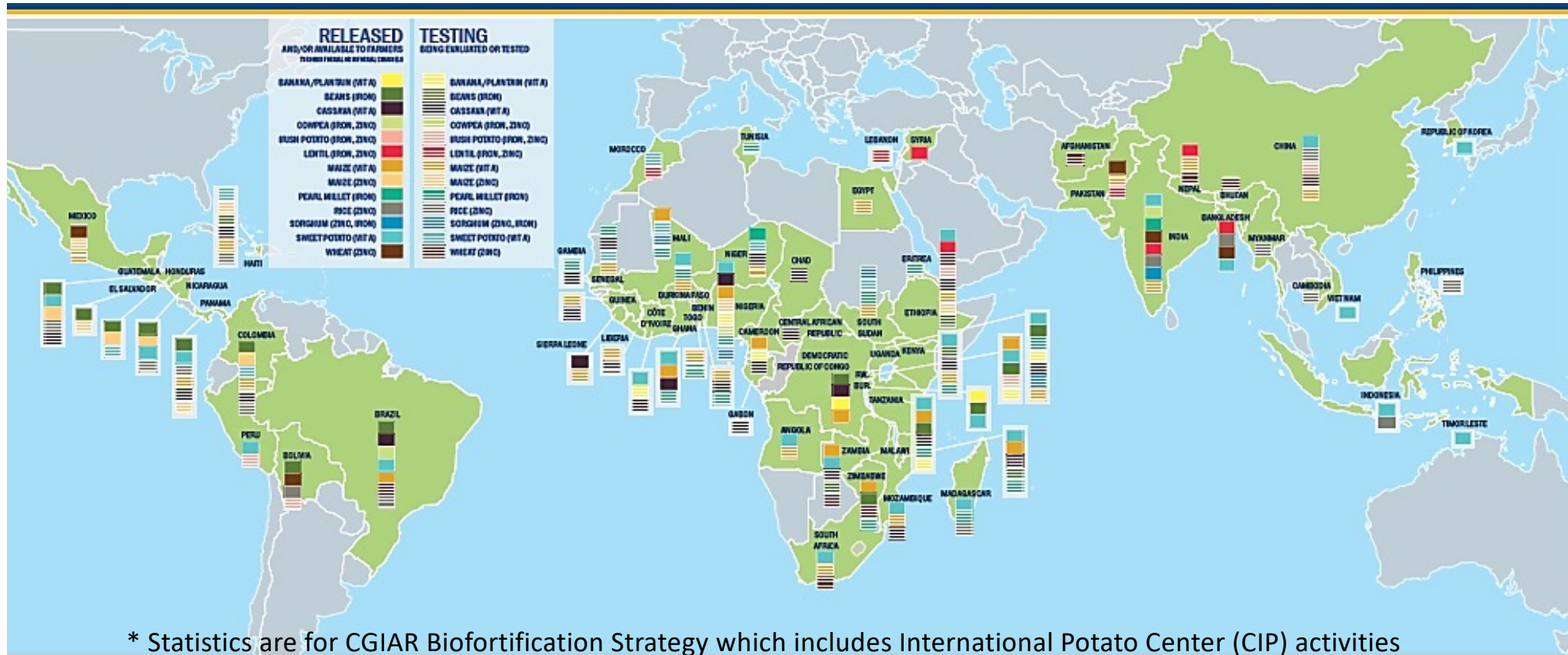
Asia	HIB	IPM	ZIM	ZIR	ZIW	ABP	VAC	VAM	OSP	IZC	IZP	IZL	ZIS
Afghanistan					T								
Bangladesh				R	R				R			R	
Bhutan					T						T		
Cambodia				T									
China				T	T			T	R		T		
East Timor									R				
India		R		R	R			T	R	R	T	R	R
Indonesia				R					R				
Lebanon												T	
Myanmar				T									
Nepal					T			T			T	R	
Pakistan				R				T				T	
Philippines				T									
South Korea									R				
Syria												R	

LatAm/Caribbean	HIB	IPM	ZIM	ZIR	ZIW	ABP	VAC	VAM	OSP	IZC	IZP	IZL	ZIS
Bolivia	R		R		R						T		
Brazil	R			T	T		R	R	R	R			
Colombia	R		R	T			T	T	R				
El Salvador	R		T	R									
Guatemala	R		R	T			T		R				
Haiti	T		T	T				T	T				
Honduras	R		R						T				
Mexico			T		R			T					
Nicaragua	R		R	T					R				
Panama	R			T	T		T	T	R				
Peru									R		T		



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Nearly 400 Biofortified Varieties Released; 10 Million Farm Households are Producers*



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Nutrition Evidence: Improved Functional Outcomes

- Efficacy trials with vitamin A, iron, and zinc biofortified crops have also shown improved functional outcomes:
 - Improved cognitive function (**iron**)
 - Better work performance (**iron**)
 - Reduced morbidity (**zinc** and **provitamin A**)
 - Better sight adaptation to darkness (**provitamin A**)



Increasing Intakes of Non-Staple Foods

- Increase supply of ***specific key foods*** that can contribute importantly to nutrient intakes and where ***supply can be increased cost-effectively*** through public policy and investments.
 - The primary objective is to ***lower the price*** of these specific foods
 - These specific foods will vary greatly by country



Increasing Intakes of Non-Staple Foods

- “Food Systems” is a very broad and complex concept that can be paralyzing in terms of determining specific actionable interventions.
 - Start with the specific foods that can make a difference, then do what is necessary within particular food systems to relieve constraints to expanding supply and lowering the price.

David Baguma, West Nile team leader for East-West Seed Knowledge Transfer, inside the recently constructed seedling house



Key Issues Moving Forward

- Staple food staples offer advantages under the COVID pandemic
 - Continued high levels of consumption of food staples
 - Government focus on ensuring food staple supplies
 - Extra nutrients at no extra cost, as incomes fall and dietary quality worsens
- Optimal mix of short-run nutrition-direct and long-run nutrition-smart interventions
- More funding under the overall nutrition umbrella



Key Issues Moving Forward

- Long gestation periods for implementation of nutrition-smart agricultural interventions
- Will agricultural policymakers give priority to human nutrition objectives?
- Positive examples are required for encouraging further investments in additional nutrition-smart agricultural interventions.



Plaque in Lobby of FAO Headquarters

“In this building, 16th of October 1945, representatives of 44 nations met and established the FOOD AND AGRICULTURAL ORGANIZATION, first of the new United Nations Agencies. Thus, for the first time, nations organized to raise levels of nutrition and to improve production and distribution of food and agricultural products.”



In Conclusion ...

“Such intimately related subjects as agriculture, food, nutrition and health have become split up into innumerable rigid and self-contained little units, each in the hands of some group of specialists. The experts, ...soon find themselves...learning more and more about less and less...The remedy is to look at the whole field covered by crop production, animal husbandry, food, nutrition, and health as one related subject and...to realize...that the birthright of every crop, every animal, and every human being is health.”

”





Sir Albert Howard, 1873-1947

“The Soil and Health,” 1945

Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa



THANK YOU

(some suggested reading and links follow)



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Biofortification Reference

- “*Food Biofortification—Reaping the Benefits of Science to Overcome Hidden Hunger*,” Council for Agricultural Science and Technology, October, 2020.
- Link to copy of paper:
 - https://www.cast-science.org/wp-content/uploads/2020/10/CAST_IP69_Biofortification-1.pdf
- Link to Webinar (paper release at World Food Prize):
 - <https://youtu.be/PqWk47a7db0>



Biofortification Reference

- “Multiplying the efficiency and impact of biofortification through metabolic engineering,” October, 2020
Nat Commun **11**, 5203 (2020). <https://doi.org/10.1038/s41467-020-19020-4>
- Link to paper (open access):
 - <https://rdcu.be/b8yvp>



References on Income/Food Prices → Diets

- **Macro shocks and micro outcomes: child nutrition during Indonesia's crisis**
Steven Block, Lynnda Kiess, Patrick Webb, Soewarta Kosen, Regina Moench-Pfanner, Martin W. Bloem and Charles Timmer
Economics & Human Biology, 2004, vol. 2, issue 1, 21-44
- **Food prices, household income, and resource allocation: Socioeconomic perspectives on their effects on dietary quality and nutritional status.** Bouis HE, Eozenou P and Rahman A. 2011. Food and Nutrition Bulletin, Vol. 32(1): S14-S23.
- **Does it matter how we survey demand for food?: Evidence from Kenya and the Philippines.** Bouis, H., L. Haddad, and E. Kennedy. 1992. Food Policy 17 (6): 349-360.



FOOD AND NUTRITION BULLETIN

Volume 21, Number 4, December 2000

SPECIAL ISSUE ON IMPROVING HUMAN NUTRITION THROUGH AGRICULTURE—
GUEST EDITOR: HOWARTH E. BOUIS

Agriculture and Nutrition Security Personal Perspectives

Howarth E. Bouis

<https://www.nutri-agriperspectives.com/>

On the point about the long gestation (lag) times for agricultural investments and the complexity of food systems, I have written the following blog:

<https://www.nutri-agriperspectives.com/post/the-carrot-strategy-a-time-to-choose>



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Speaker- Dr. Yusuf Dollah

Harvestplus Nigeria, Crop Delivery Manager/Nigeria
Maize Specialist with focus on biofortified crops in the
North of Nigeria





Biofortification in West Africa: Progress and Prospects

Yusuf Dollah
HarvestPlus Nigeria

Presentation by Dr. Yusuf Dollah, HarvestPlus Nigeria Maize Specialist

HarvestPlus.org



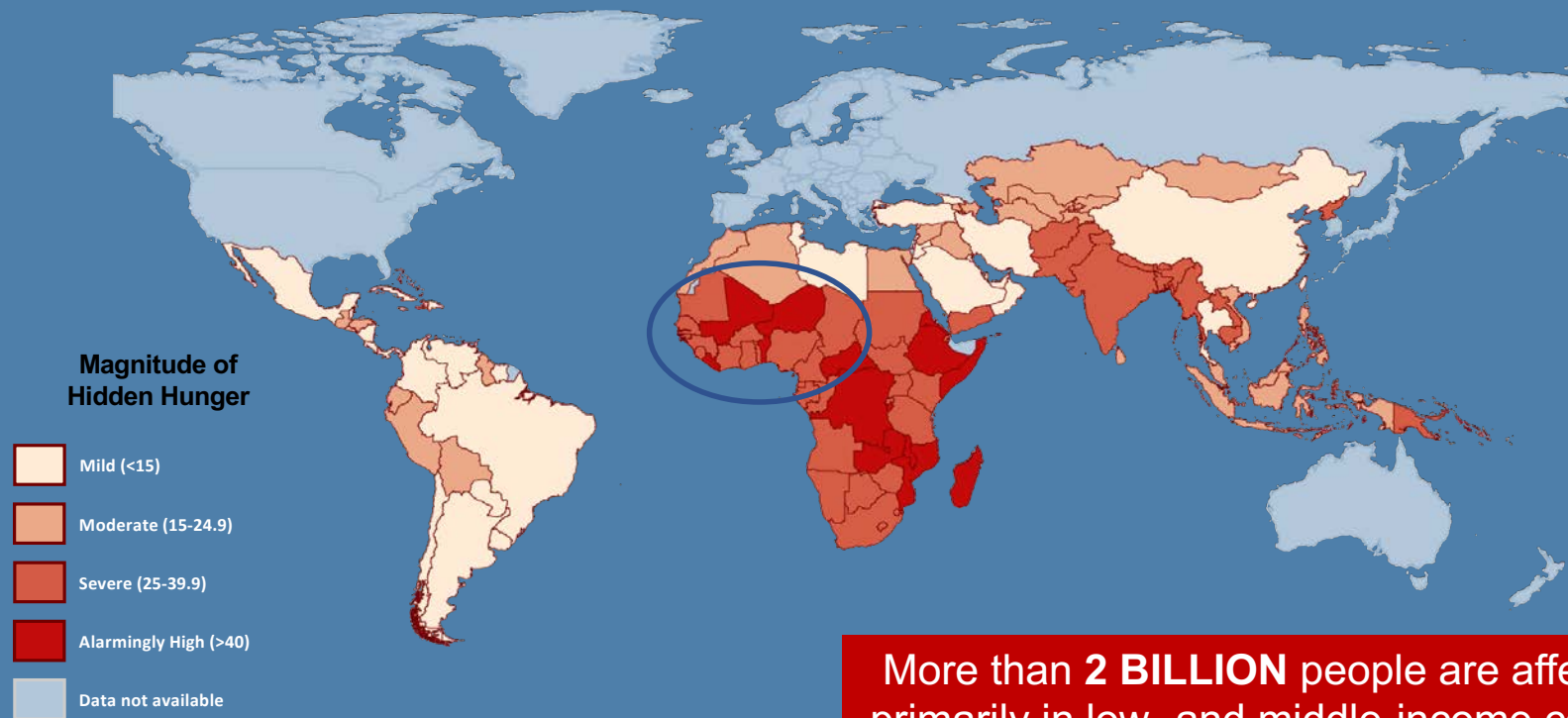
Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa



RESEARCH
PROGRAM ON
Agriculture for
Nutrition
and Health

Led by IFPRI

Biofortification Targets a Global Health Crisis: Micronutrient Deficiency, or “Hidden Hunger”



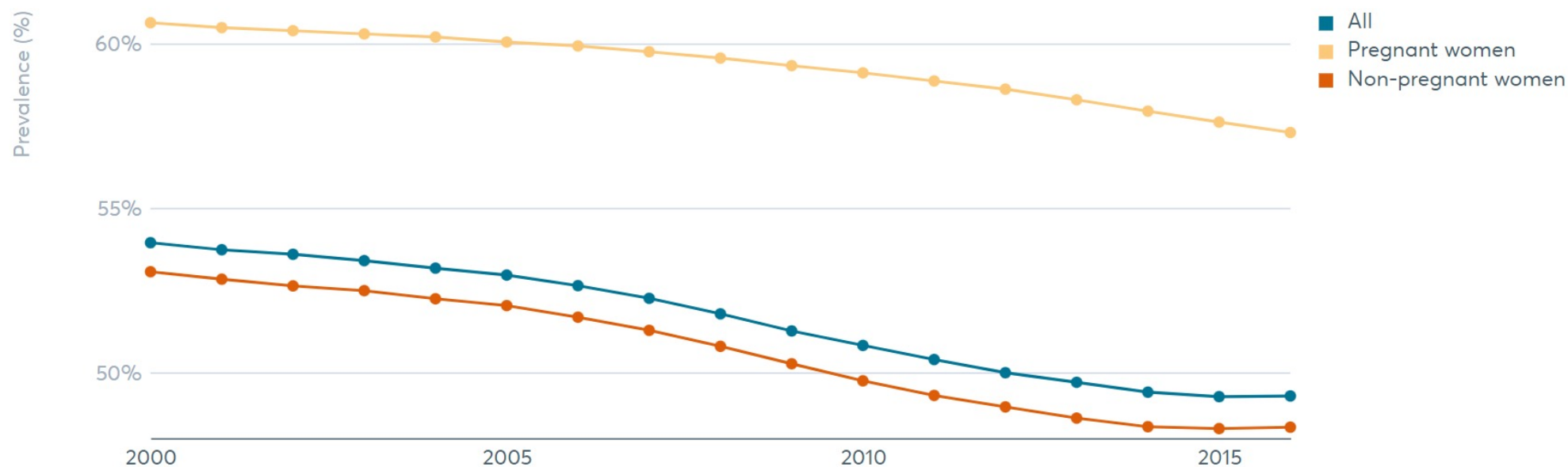
More than **2 BILLION** people are affected—primarily in low- and middle-income countries



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

W. Africa Micronutrient Deficiency Burden: Anemia

Prevalence of anaemia among women of reproductive age



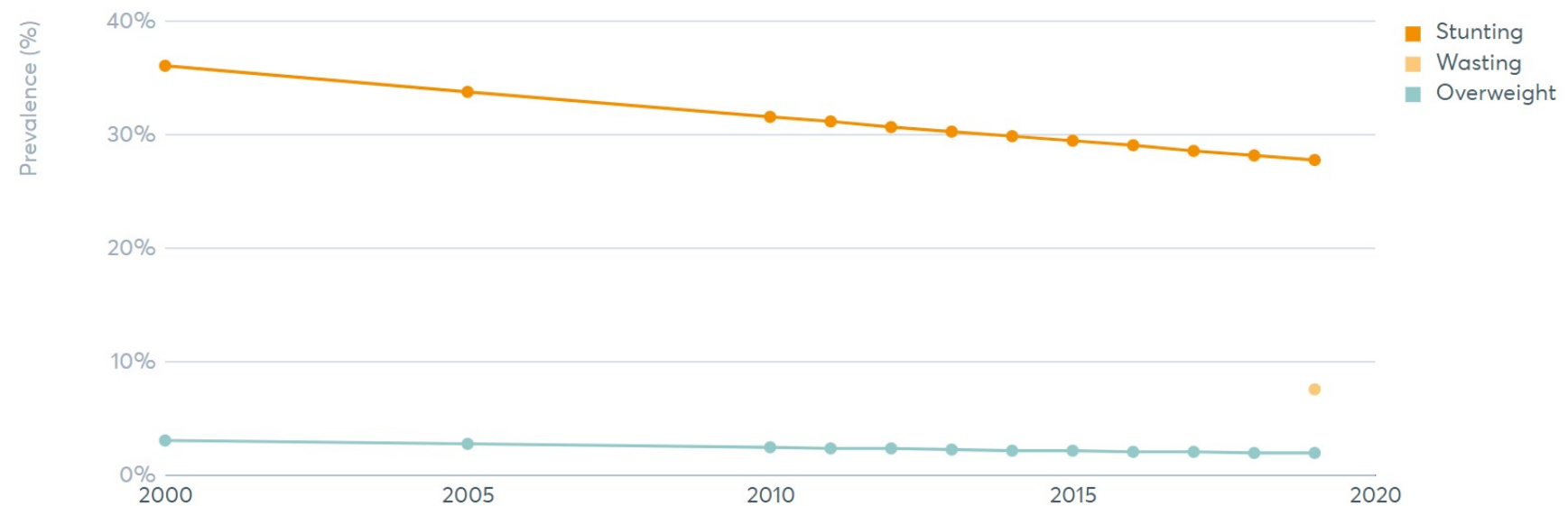
Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa 2020 Global Nutrition Report

W. Africa Micronutrient Deficiency Burden: Stunting

Burden of malnutrition

Infant and young child nutrition status

Prevalence of stunting, wasting and overweight in children under 5 years of age



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

2021 Global Nutrition Report

Biofortified Crops Developed by HarvestPlus and Partners

Iron



Pearl Millet

Provides **up to 80%** of daily iron needs



Beans

Provides **up to 80%** of daily iron needs



Wheat

Provides **up to 50%** of daily zinc needs



Rice

Provides **up to 40%** of daily zinc needs



Maize

Provides **up to 70%** of daily zinc needs

Vitamin A



Sweet Potato

Provides **up to 100%** of daily vitamin A needs



Cassava

Provides **up to 100%** of daily vitamin A needs



Maize

Provides **up to 50%** of daily vitamin A needs

Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa



Biofortified varieties released (R) or in Testing (T) in 13 West African countries as of the end of 2020

Africa	HIB	IPM	ZIM	ZIR	ZIW	ABP	VAC	VAM	OSP	IZC	IZP	IZL	ZIS
Benin Rep		T					T	T					
Burkina Faso		T						T	R				
Côte d'Ivoire						T	T		R				
Gambia		T					T						
Ghana		T					R	R	R				
Guinea						T	T						
Liberia							T	T					
Mali		T						R	T				T
Niger		R					T	T	T				
Nigeria		T	T			T	R	R	R	T			T
Senegal		R					T	T	T				
Sierra Leone							R	T					
Togo		T						T					

HIB = Iron Bean
IPM = Iron Pearl Millet

ZIM = Zinc Maize
ZIR = Zinc Rice
ZIW = Zinc Wheat

ABP = Vit. A Banana/Plantain
VAC = Vit. A Cassava
VAM = Vit. A Maize
OSP = Vit. A Orange Sweet Potato

IZC = Iron/Zinc Cowpea
IZP = Iron/Zinc Irish Potato
IZL = Iron/Zinc Lentil
ZIS = Zinc/Iron Sorghum

Source: HarvestPlus, International Potato Center (2020)



Iron Pearl Millet: A Nutrition Source for Arid Regions

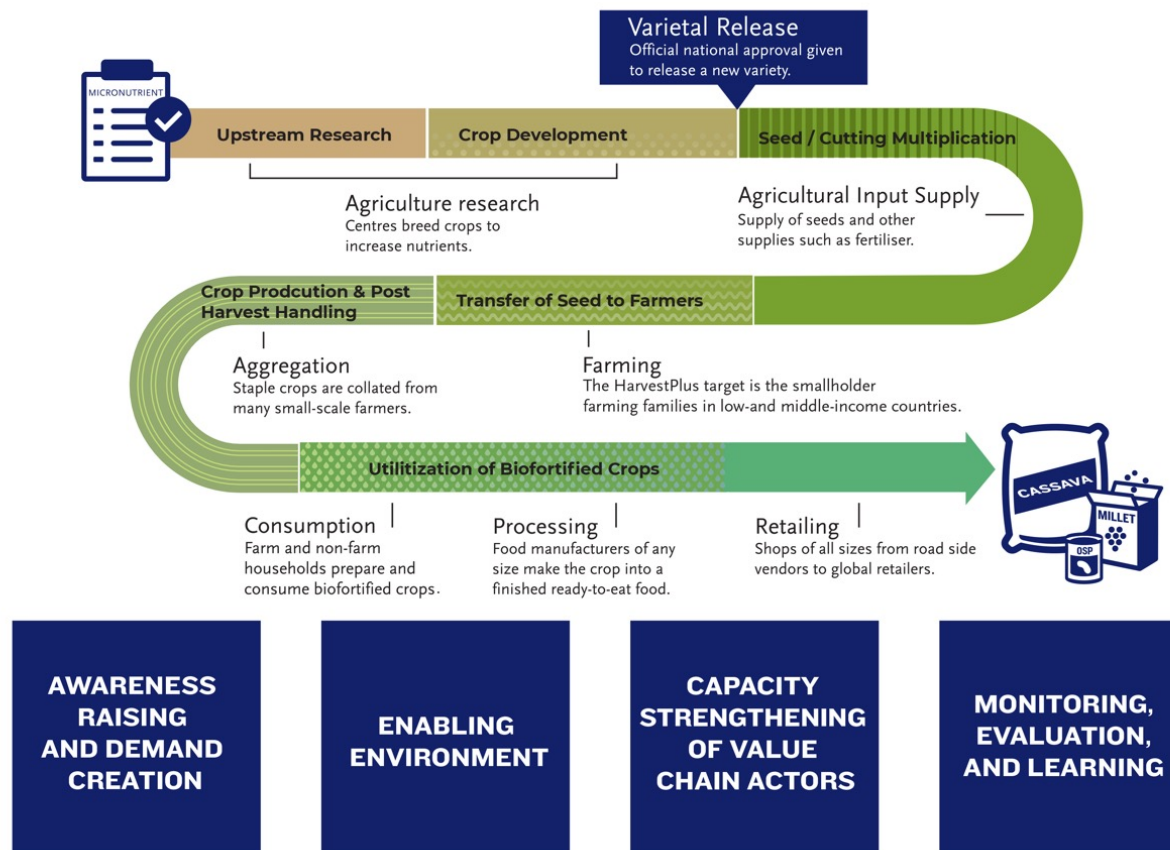


- “Chakti” iron pearl millet variety released in Niger in 2018
- ECOWAS rules allow this variety to be cultivated in any member country w/o further approval
- Introduced in Senegal through l’Institut Sénégalais de Recherches Agricole (ISRA) , delivered through U.S. Feed the Future Senegal Kawolor project.



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Sustainable Scaling: Value Chain Partnerships, Strengthening Capacities, Fostering Enabling Environments



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Scaling in Nigeria: Increasing SME Investments Along the Value Chain

- **Seed companies:** Premier, Valuesseeds, Advantaseeds, SeedCo, GoldAgric, Techniseeds, Jirkur, etc.
- **Aggregators:** Babangona, Thrive Agric, Afex, etc
- **Food processors:** Cassanova, Cropshares Africa, Grandios Pap, Krunch Foods, Esomchi, etc)
- **Investors in grain/tuber production:** Brent Farms, Niji Farms, Odeda Farm Institute, Kellogs

Challenges – insecurity affecting production and distribution, inflation



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Scaling in Nigeria: Value Chain Partnerships in Action



Kellogg's Tolaram

- 2 varieties (Oba Super 6 and Sammaz 52) proposed
- 250MT procured from Niger & Kaduna supplied to Lagos factory
- Sammaz 52 found suitable
- Purchased 1200kg of seeds for direct production of 400ha
- Working with outgrowers in Kaduna, Nasarawa, and Kano states to ensure sustained supply
- Targeting 3000Mt of Sammaz 52 grains for 2022 production year



Cassanova

- 6 varieties proposed; 120kg of tubers sourced & supplied to Abuja
- 2 varieties (164773 & 164776) found suitable
- Facilitated outgrower partnership with Cropshare
- New product development using VAC flour
- ToT for 18 extension agents to cascade to outgrowers



Brent Farms

- Identify suitable variety
- Linkage to seed company
- Procured 20,000kg of Sammaz 52
- Identification and training of field staff
- Linkage to HarvestField for Aflasafe, Syngenta for herbicides



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Scaling in Nigeria: Strengthen the Enabling Environment

Former President,
Chief Olusegun Obasanjo



Sen. Bima Muhammad Enagi, Vice
Chairman, Senate Committee on Agriculture &
Rural Development & Vice Chairman Senate
Committee on Local & Foreign Dept.



Dr. Adeola Odedina
Commissioner for Agriculture
Ogun State
Host, Nutritious Food Fair, 2021



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa



Thank You!

Yusuf Dollah
HarvestPlus Nigeria

d. yusuf@cgiar.org

HarvestPlus.org



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa



**RESEARCH
PROGRAM ON
Agriculture for
Nutrition
and Health**

Led by IFPRI

Speaker- Dr. Rose Omari



Senior Research Scientist at the Science and Technology
Policy Institute, Council for Scientific and Industrial Research
(CSIR-STEPRI), Ghana

Biofortification in Ghana

A Presentation at the Webinar on “Addressing Hidden Hunger
Through Agriculture: Progress with Biofortification in West Africa

15 September 2021 11:00 – 13:00 UTC/GMT

By
Dr. Rose Omari
CSIR-STEPRI, Ghana



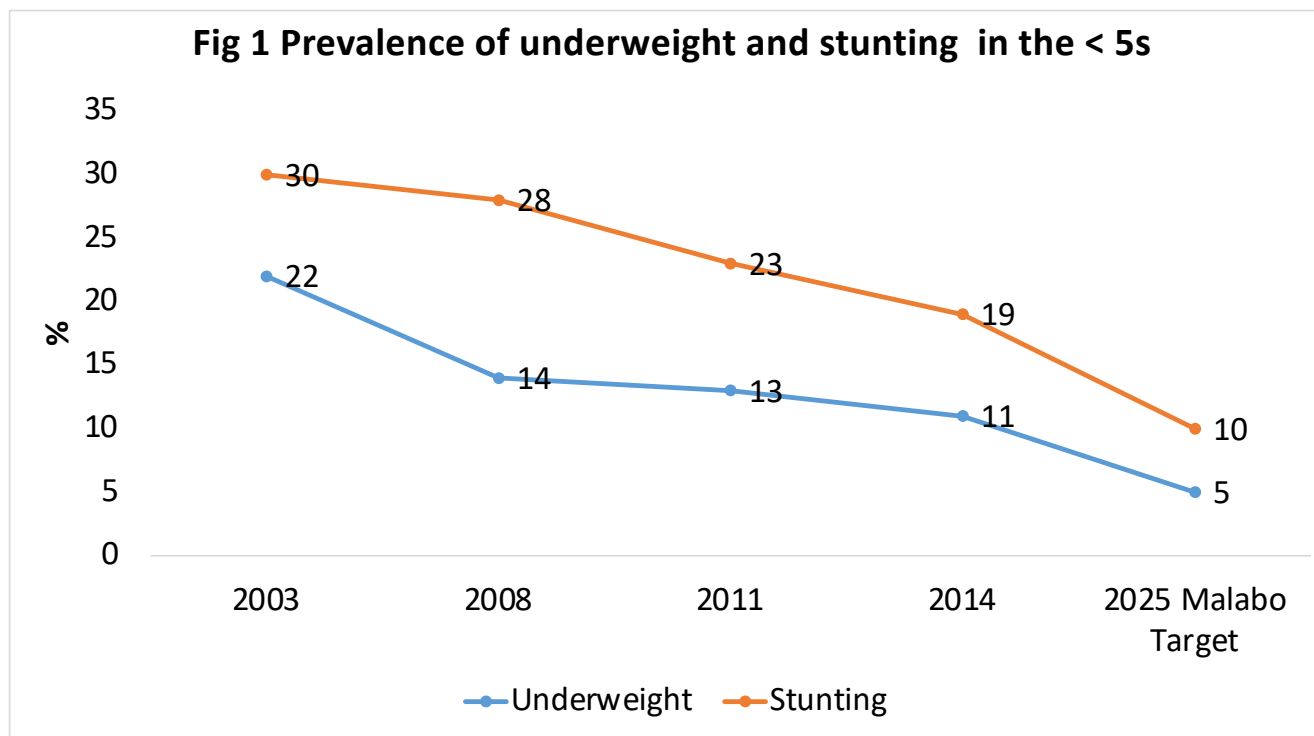
Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Outline

1. Nutritional status in Ghana
2. National Strategies for combating micronutrient deficiency
3. Biofortification as an intervention strategy
4. Challenges with scaling up biofortified products
5. Conclusion



Nutritional status



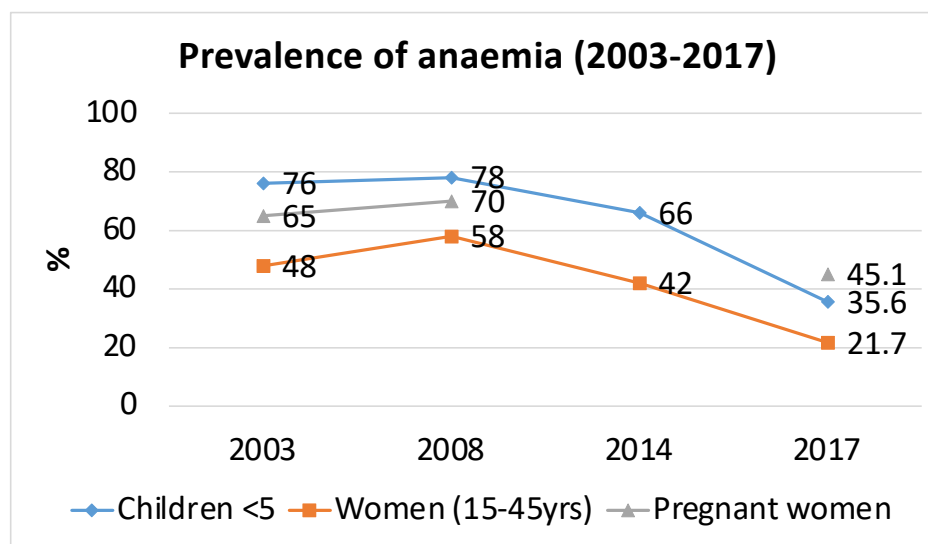
Source: Multiple Indicator Cluster Survey (2011); GDHS (2014); CAADP Malabo Declaration (2014)



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Micronutrient status

- Vit A. deficiency 20% among children and rarely present in women
- Iron deficiency is responsible for >50% of anaemia



GDHS 2003-2014; Ghana MN Survey 2017



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Interventions contributing to improvements

- Food fortification e.g. 2008 LI on mandatory fortification
 - Veg. oils with Vit A – 56% usage
 - Wheat flour with iron, folic acid, zinc, and B vitamins – 2% fortified due to organoleptic problems
- Supplementation: e.g. Vit A, GIFT- Girls Iron Folate Tablet (Adolescents in school & out of school)
 - high cost, low coverage
- Other Public health interventions- deworming, malarial treatment
- Diet diversification –
 - High cost, limited availability, low micronutrient content of staple
- Biofortification – an option to be considered based on nutrition evidence from other countries



Biofortification as an intervention in Ghana

- Production of OFSP was promoted under Reaching Agents of Change (RAC) project
- Due to limited food uses and the quest to promote OFSP, efforts are being made to
 - diversify OFSP menus at the household level
 - Produce processed and more shelf stable products
- Through extensive research and product development and funding from the 'Jumpstarting orange fleshed sweet potato in West Africa through diversified markets' project
 - OFSP products and recipes developed and transferred to actors
 - A TOT module for OFSP utilization and processing developed
 - Stakeholders trained to use the manual.
 - Several products including complementary foods produced and found to be nutritionally enriched as a result of biofortification
- Through a new project, AGRA will
 - support promotional campaigns on OFSP
 - mobilise political will and support for OFSP to combat malnutrition
- Promote lesser known biofortified staples - Vit A Cassava & Maize, High iron & zinc cowpea.



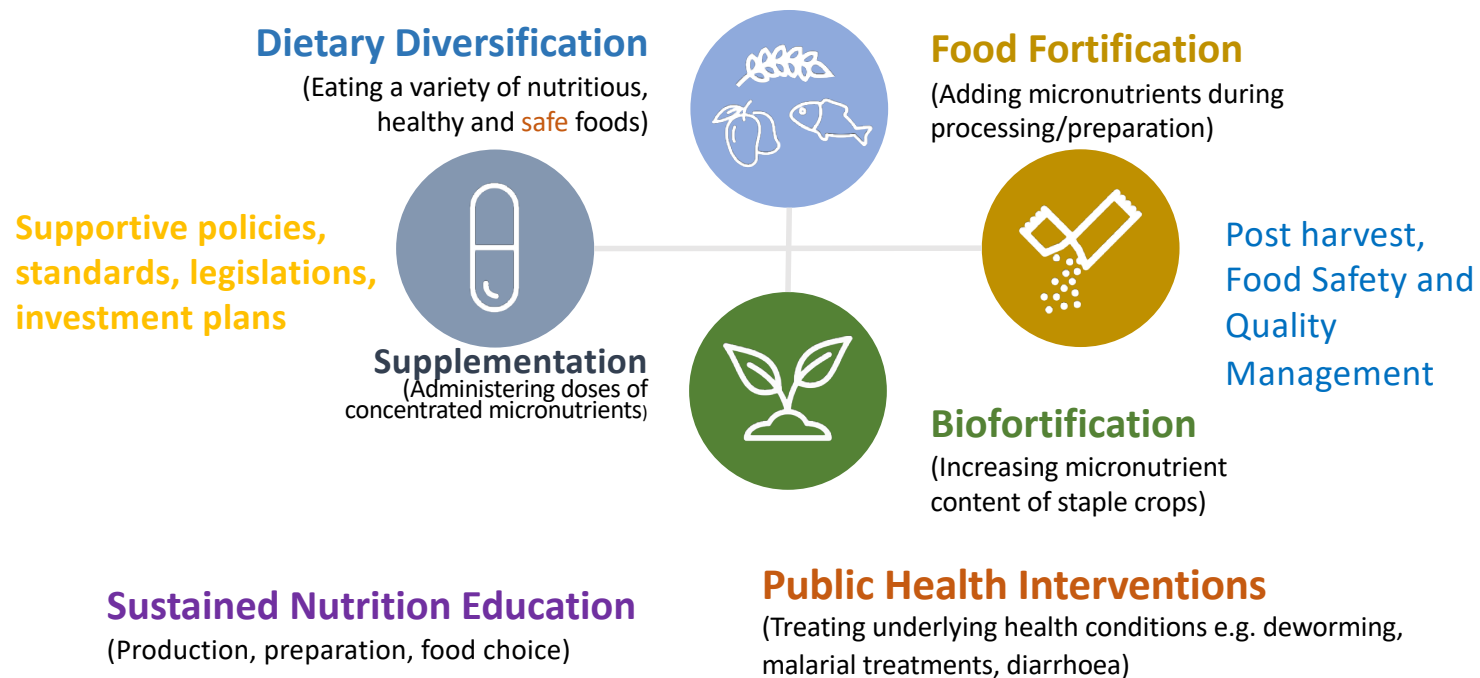
Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Some Challenges in scaling up Biofortified crops

- Public perception that all biofortified crops are GM crops
- Inability of consumers to differentiate between some biofortified crops and traditional crops e.g. beans and maize
- Concerns about loss of nutrients during post-harvest handling & cooking
- Low awareness and availability of biofortified crops
- Short shelf-life of OFSP
- Lack of testing facilities for micronutrient content



Conclusion: We Support the Holistic Approach



These interventions are most effective when combined

Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa



Thank you



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Speaker- Senator Muhammed Bima Enagi of Nigeria



Distinguished Senator Bima has over the past two years promoted the cause of biofortification at the Nigerian Senate

Speaker- Seth Osei-Akoto

Director, Directorates of Crops Services
(Crop fortification), Ghana



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Speaker- Dr. Jonas Chianu



TAAT Program Manager at the African Development Bank



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Speaker- Dr. Ramadjita Tabo



Dr Ramadjita Tabo, Regional Director, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) West and Central Africa

Addressing Hidden Hunger through Agriculture

Progress with biofortification in West and Central Africa: Scaling Up Strategy along the Value Chain

Dr Ramadjita Tabo, Regional Director
ICRISAT-West and Central Africa

15th September 2021



ICRISAT is a member of the
CGIAR System Organization



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa



ICRISAT STRATEGY FOR IMPROVING NUTRITION A 4 STEP-STRATEGY

1. Biofortification through crop breeding and release of biofortified varieties
2. Seed system development with diverse partners
3. Upscaling improved seed and agronomic practices
4. Partnering with the private sector for product development, processing and wider upscaling



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

1. Biofortification through crop breeding and release of biofortified varieties

Sorghum variety with higher iron (Fe) and Zinc (Zn) content released in Nigeria

SAMSORG 45 has 60% increase in grain Fe concentration while

SAMSORG 46 has 62% increase in grain Zn compared to the Fe concentration of 35.0ppm/1g and Zn 25.0ppm/1g average in sorghum grain

SAMSORG 45 (12KNICSV-188)

Iron (Fe) 56.30ppm/1g

Zinc (Zn) 28.08ppm/1g



SAMSORG 46 (12KNICSV-22)

Iron (Fe) 35.90ppm/1g

Zinc (Zn) 40.50ppm/1g



Addressing Hidden Hunger Through Agriculture: Progre

ICRISAT Biofortification through crop breeding and release of biofortified varieties (cont.)



Chakti already has over 65mg/kg iron content compared with popular farmer varieties with about 47mg/kg, breeding efforts continue to make it even more nutritious.



Pearl millet varieties GB 8735 and ICTP 8203 have been selected for fast track improvement and release in Niger, Ghana and Senegal.



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

2. Seed system development with diverse partners

Improving the availability and accessibility of seeds in rural areas

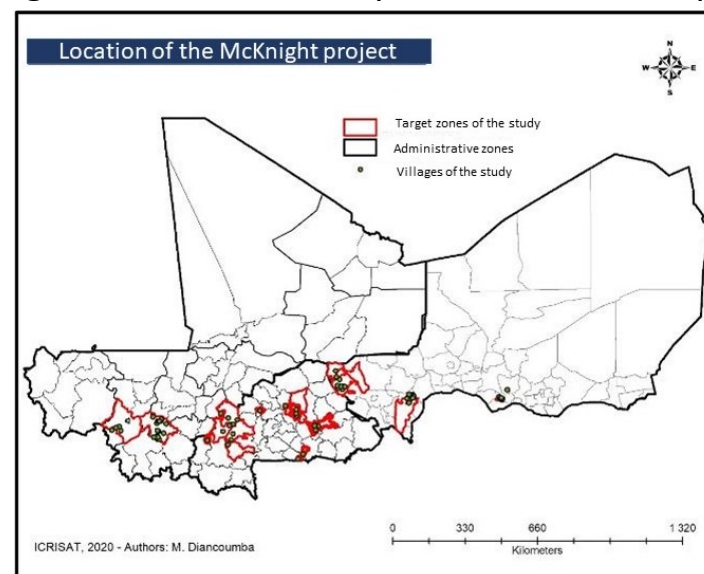
- Production of certified seed
- Use of local media to communicate on variety characteristics and seed availability
- Use of outlets developed by FOs for seed sale in remote villages
- Training of farmers, seed companies and farmers organizations on seed production techniques



Use of local radios



Mini-packs of sorghum seed



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa



3. Upscaling improved seed and agronomic practices



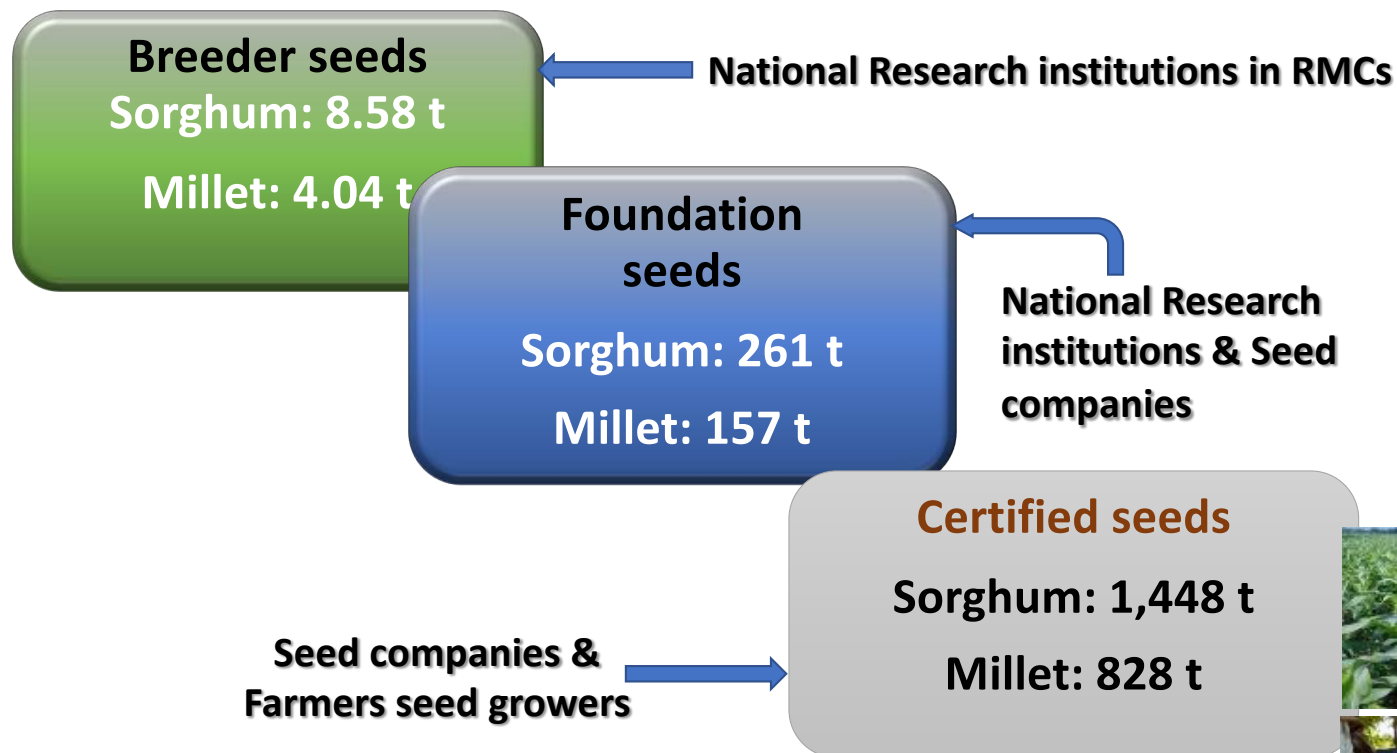
Demonstration plots of biofortified varieties and hybrids
Hybrid seed parents research consortium- West Africa
Innovation Platforms for sustainability



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Boosting seed sector - Genetic potential in the hands of the farmers

Achievements of the Sorghum and Millet Compact



Addressing Hidden Hunger Through Agriculture: Progress with Biofor

Varieties in seed production in Mali and Burkina Faso analysed for Fe, Zn and proteins content (10 varieties identified as biofortified)

Varieties	Proteins (%MS)	Fe (ppm)	Zn (ppm)	Yield and maturity	Note
Jakunbe	15	66	37	2 t/ha; 95 days	High Proteins, Fe & Zn
Jiguikala	15	71	35	2.5 t/ha; 110 days	High Proteins, Fe & Zn
Soumba	15	79	32	3 t/ha; 100 days	High Proteins, Fe & Zn
Fambé B		65	30	2 t/ha; 100 days	High Fe & Zinc
Pablo	16			4 t/ha; 100 days	Rich in proteins
Fadda		62		4.5 t/ha; 120 days	Rich in Fe



4. Partnering with private sector for product development, processing and wider upscaling



We promote the value of underutilized climate smart food crops, nutri-rich and resilient varieties (good for the consumer, the planet and the farmer)



Training session in Nigeria

Smart Food champions in Northern Nigeria



Smart Food Cooking Master classes in Mali



Smart Food Cooking TV reality show in Kenya



Showcasing millet nutritional value



Dr. Lalla Malika Issoufou, First Lady of Niger, named Smart Food Ambassador of Goodwill in 2019

Dr. Lalla Malika Issoufou, First Lady of Niger visiting ICRISAT exhibit stall during 2020 FESTIMIL edition



Encouraging industrially Processed Products in Nigeria



Collective cooking of whole grains in Mali



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa



Good for
 you
 planet
 farmer

Recent studies on millet by ICRISAT & partners



- Millet-based diet to lower risk of type 2 diabetes and help manage blood glucose levels
- Millets to reduce risk of developing cardiovascular disease



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

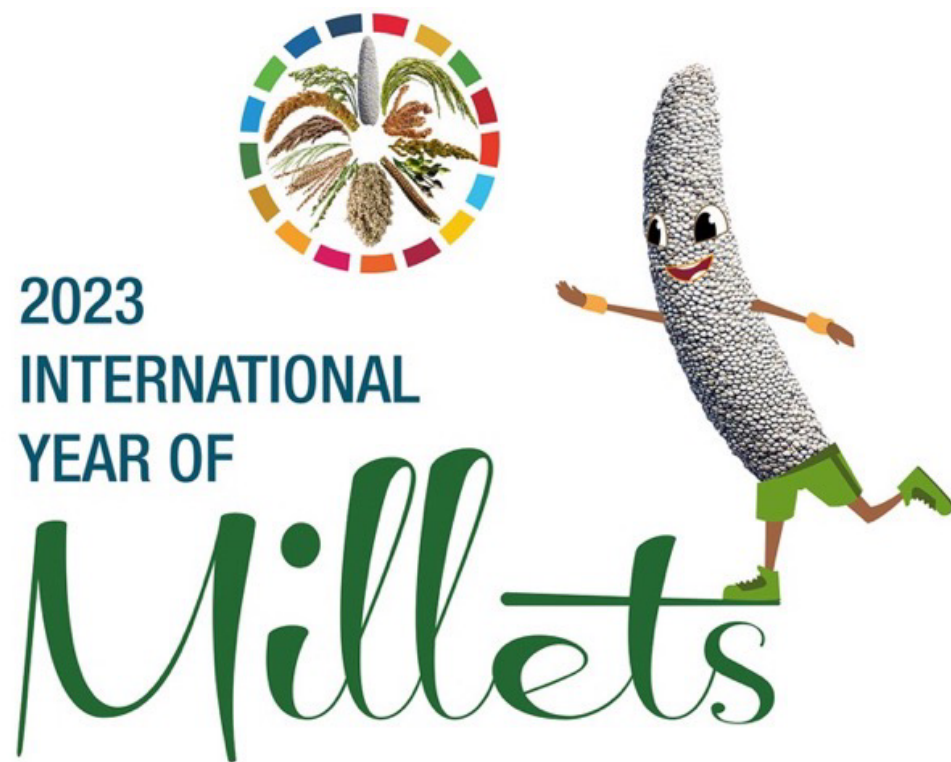
Africa Food Prize 2021

And the winner is...



INTERNATIONAL CROPS RESEARCH
INSTITUTE FOR THE SEMI-ARID TROPICS





**MERCI,
THANK YOU!**



INTERNATIONAL CROPS RESEARCH
INSTITUTE FOR THE SEMI-ARID TROPICS



ICRISAT is a member of the
CGIAR System Organization

Addressing hidden hunger through Agriculture. Progress with biofortification in West Africa



Food Fortification

Speaker- Dr. Richard Pendame



Regional Director Africa, Nutrition International



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

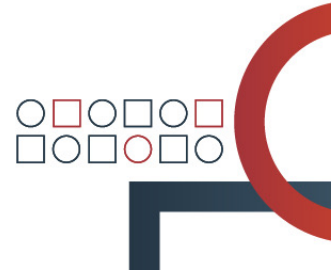


Food Fortification in Africa

AfDB/ALN/HP Addressing Hidden Hunger Webinar

Richard Pendame, MBBS, MPH
Regional Director, Africa

SEPTEMBER 15, 2021



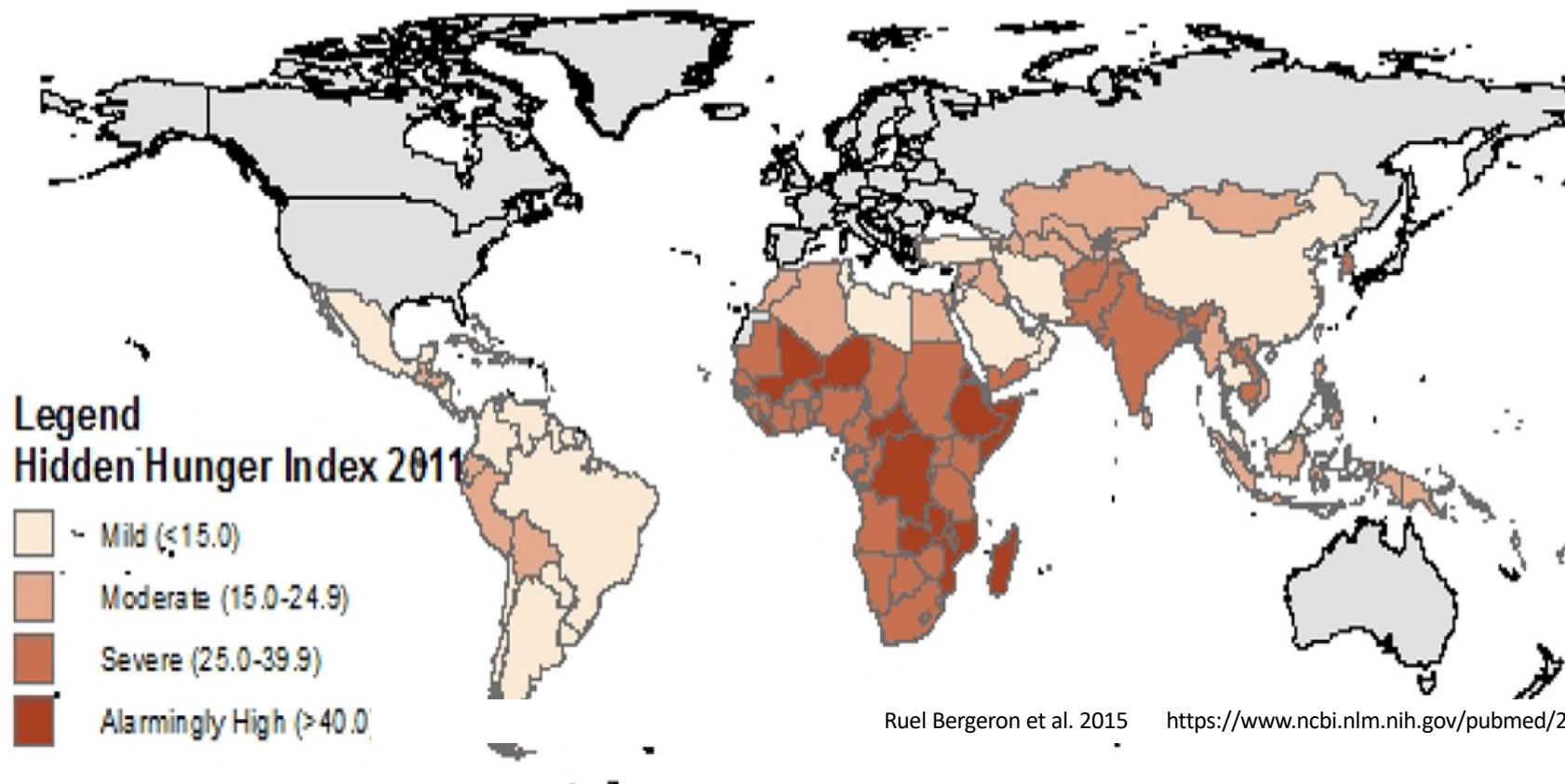


Outline

1. Micronutrient deficiency in Africa
2. Why food fortification
3. Current coverage and compliance
4. Challenges and opportunities
5. Key considerations
6. Nutrition International's support
7. Conclusion

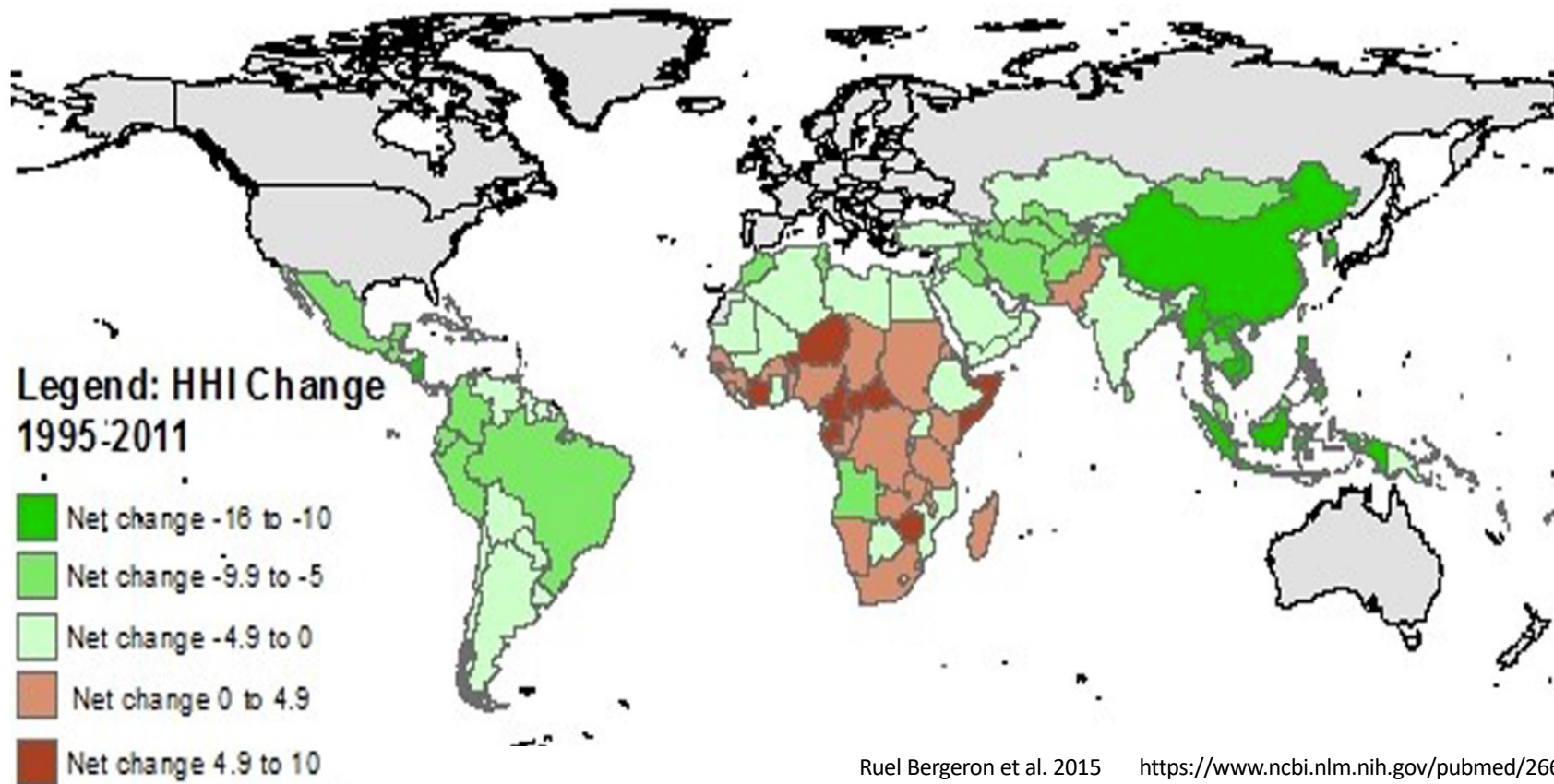


Micronutrient malnutrition (also known as “hidden hunger”) remains a massive problem in Africa and Asia





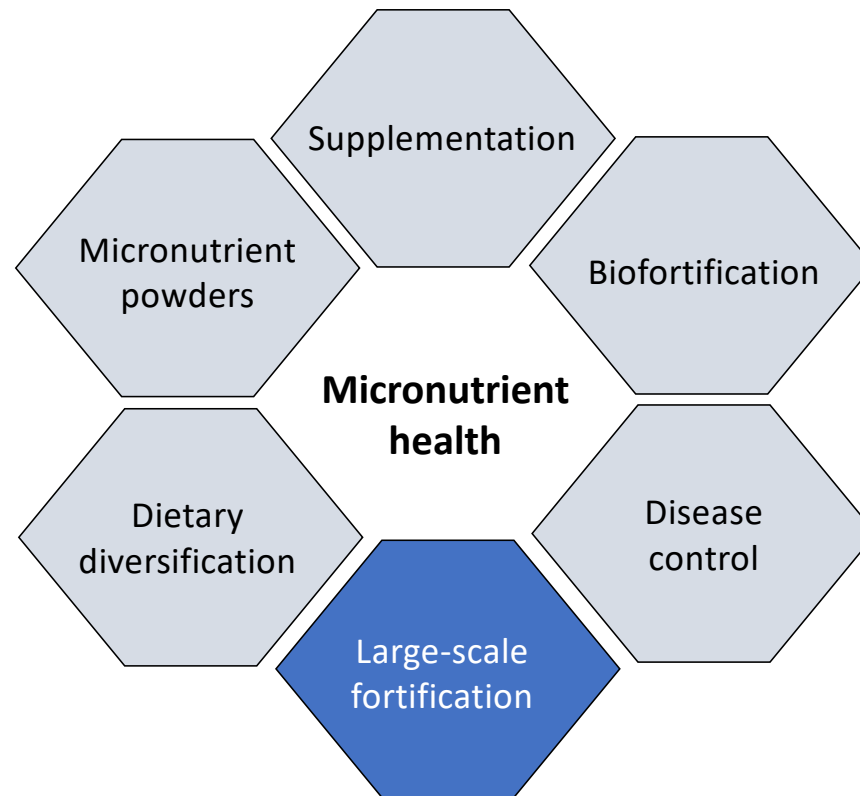
And in Africa, micronutrient malnutrition is increasing!



Ruel Bergeron et al. 2015 <https://www.ncbi.nlm.nih.gov/pubmed/26673631#>



Strategies to reduce micronutrient malnutrition



Adapted from : P Milani. Introduction to Rice Fortification. Presentation at the Scaling Up Rice Fortification in Asia Conference. Bangkok, Sept. 2014



“

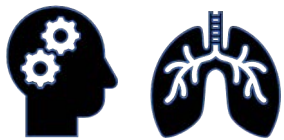
“One of the most compelling investments is to get nutrients to the world's undernourished.”

– Copenhagen Consensus

Nobel Laureate Vernon Smith's recommendation
https://www.copenhagenconsensus.com/sites/default/files/bpp_fortification.pdf



Fortification is a low-cost, high-return investment



Every \$1 invested in fortification generates \$27 in return from averted disease, improved earnings & enhanced work productivity

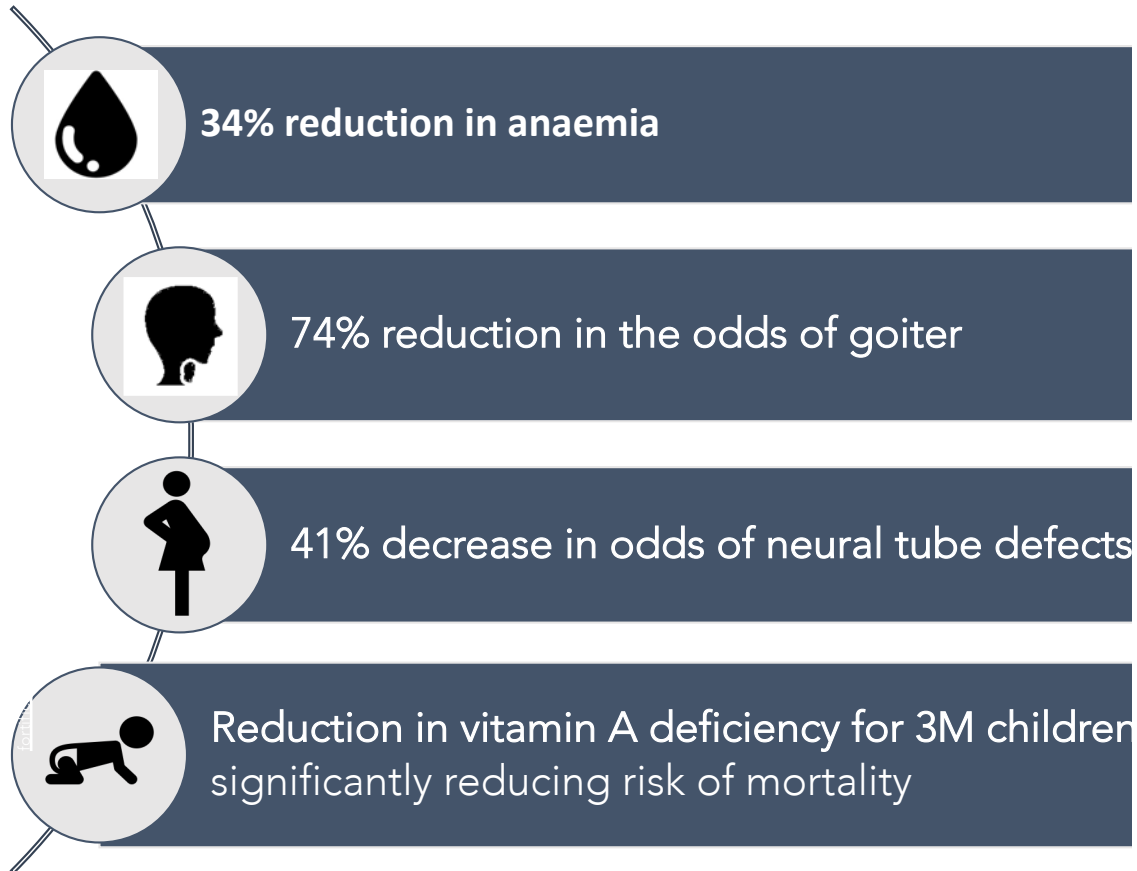
Iodized salt

- Incremental cost per person per year: \$0.05
- Benefit cost ratio: 30:1

Wheat and maize fortified with iron and folate

- Incremental Cost per person per year: \$0.12
 - Benefit cost ratio: 46:1 for folate, 8:1 for iron
-

Large-scale fortification works – at scale

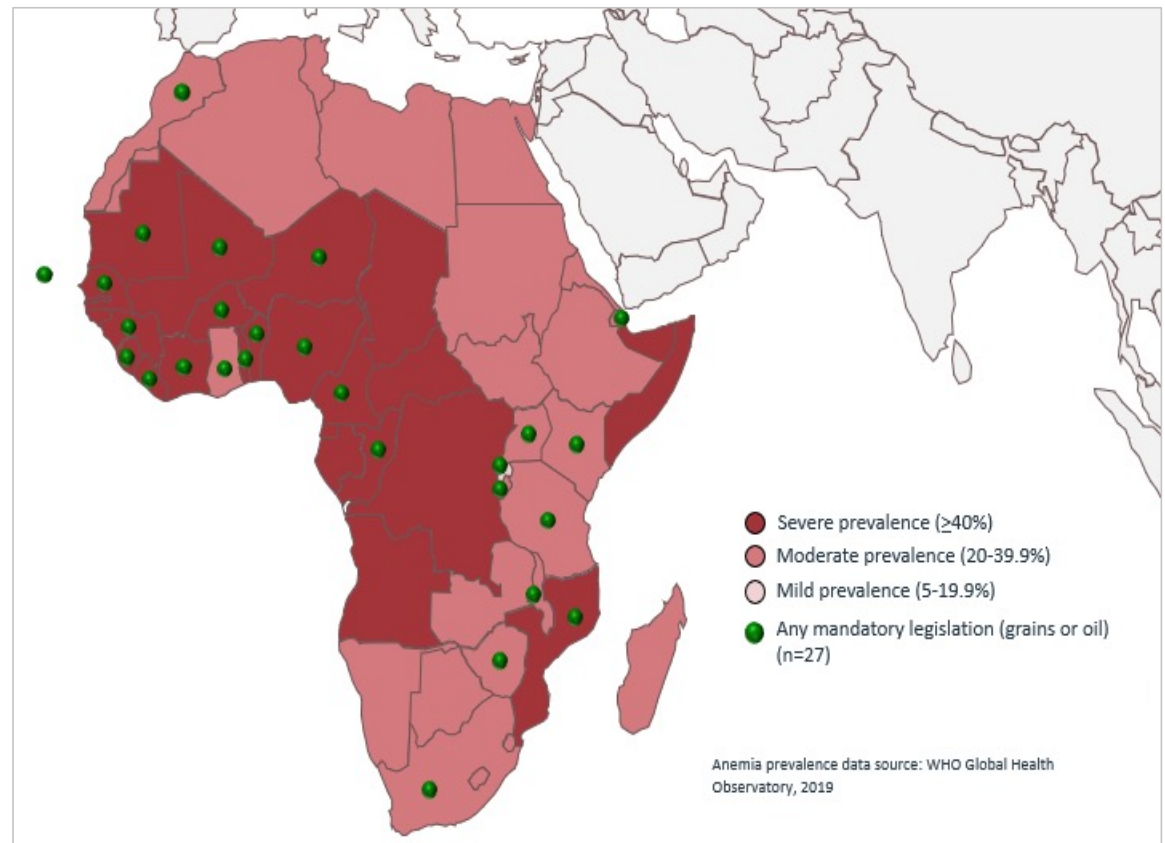


Source: Keats EC, et al Improved micronutrient status and health outcomes in low- and middle-income countries following large-scale fortification: evidence from a systematic review and meta-analysis, The American Journal of Clinical Nutrition, Volume 109, Issue 6, June 2019, Pages 1696–1708, <https://doi.org/10.1093/ajcn/nqz023>



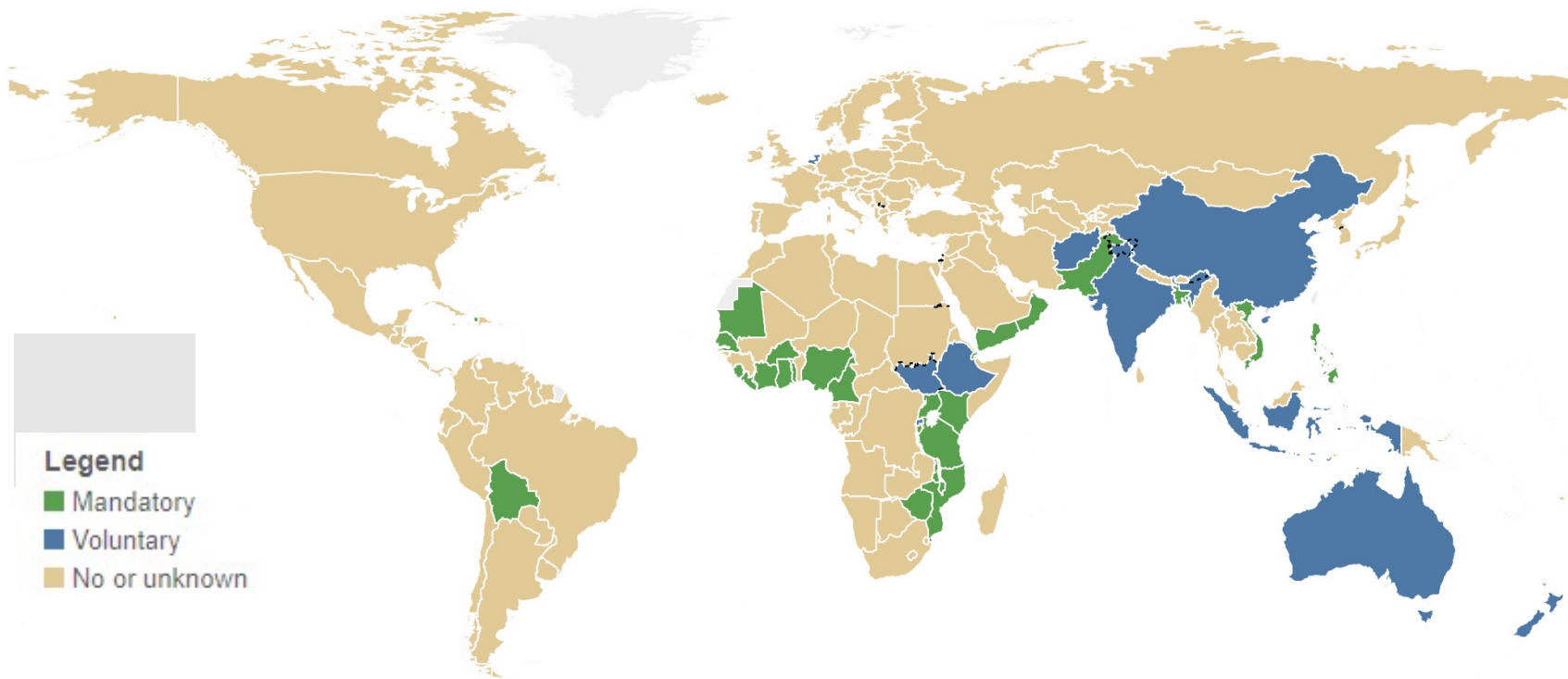
Anaemia prevalence (WRA) and staples fortification legislation in Africa

- 27 countries in Africa have mandatory legislation for at least one cereal grain and/or oil
- Of these, the majority have reached scale ($\geq 75\%$) (n=17)
- However, 10 countries have less than 75% coverage of fortified food vehicle and can still benefit from better enforcement, accountability, coverage
- 53 countries in Africa have severe and moderate anaemia prevalence
- Of these, 26 have mandatory legislation (mainly in West Africa)





Many countries in Africa have mandatory or voluntary fortification of at least one type of oil (GFDx 2020)

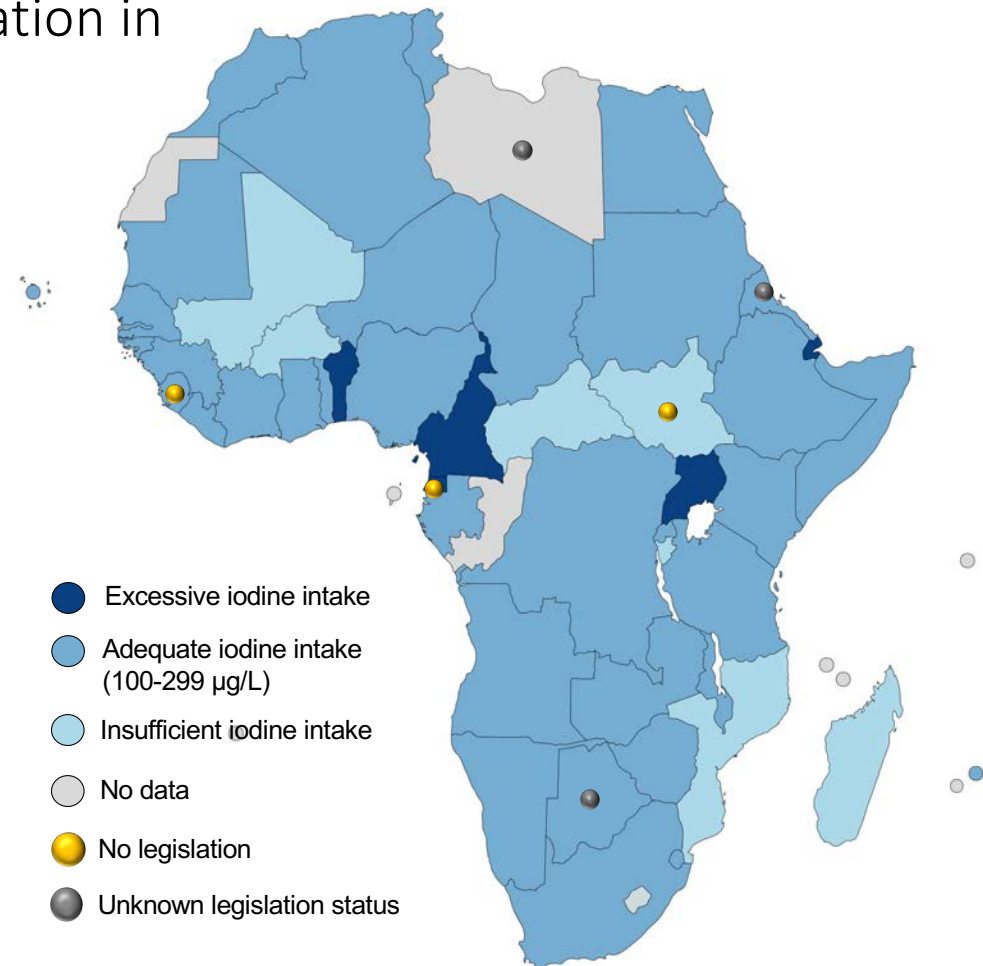


Source: Global Fortification Data Exchange (GFDx). Accessed 2020.



IDD and salt iodization legislation in Africa

- 44 countries in Africa have mandatory legislation for salt iodization
- However, 29 countries have less than 90% coverage of iodized salt and can still benefit from better enforcement, accountability, coverage
- 7 countries in Africa have insufficient iodine intake
- Of these 6 have mandatory legislation



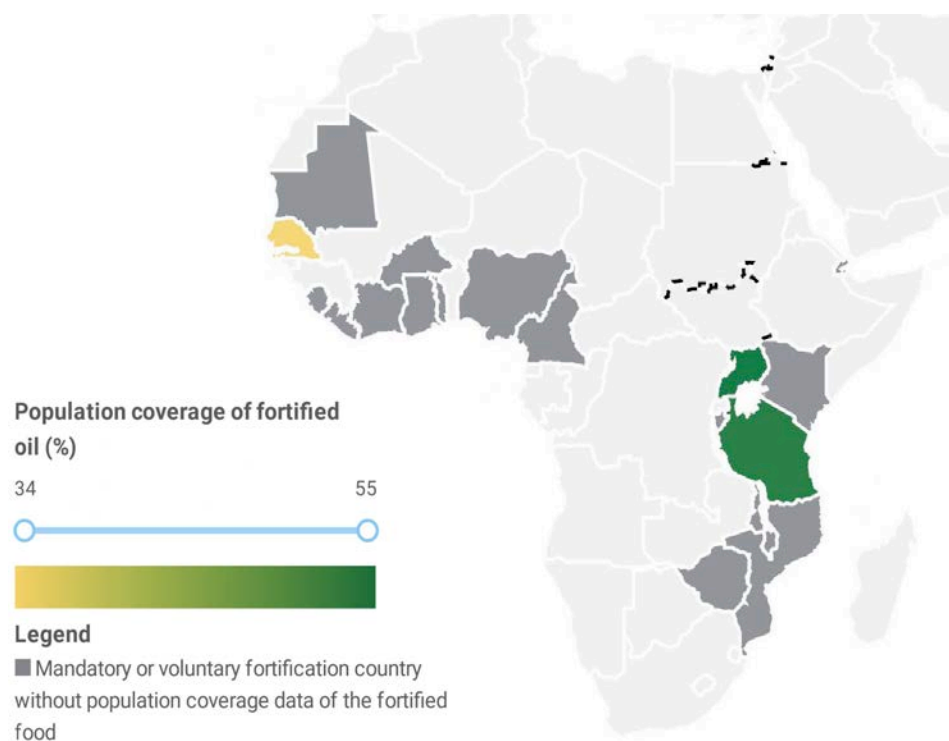


Population coverage of fortified oil

Most recent data available for a country

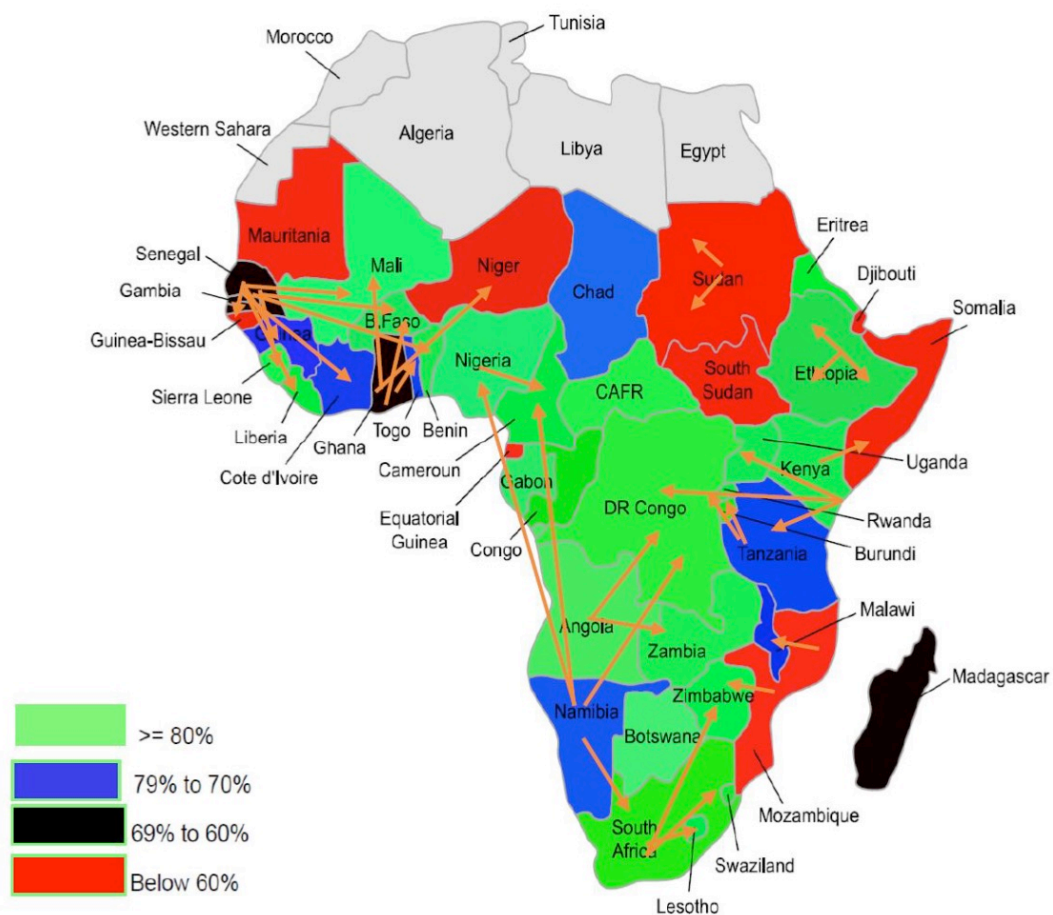
3 of 18 countries with mandatory fortification of oil have population coverage data of the fortified food

Tanzania (2015)	53.6%
Uganda (2015)	54.4%
Senegal (2017)	34.1%



Global Fortification Data Exchange. Map: Population Coverage of Food Vehicle in Countries with Mandatory Fortification. Accessed 26/09/2021. [<http://www.fortificationdata.org>.]

Salt flow throughout sub-Saharan Africa and household consumption of iodized salt

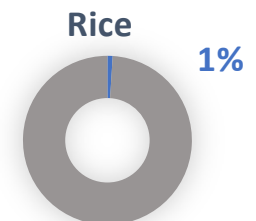
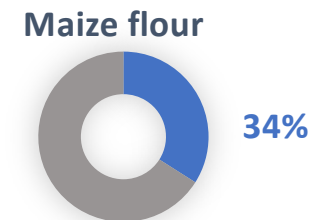
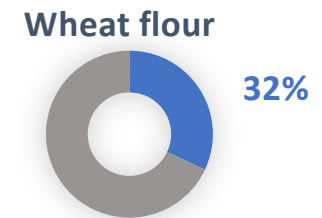
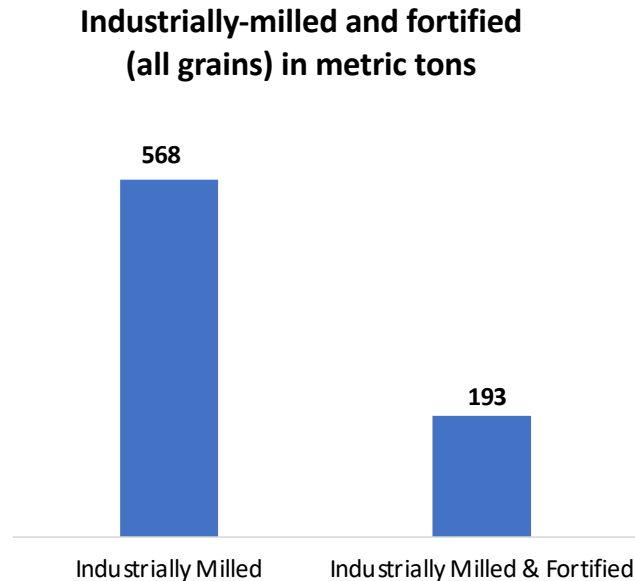


Source: UNICEF Global Database on Iodine, accessed in June 2021



Fortifiable versus fortified grains – global

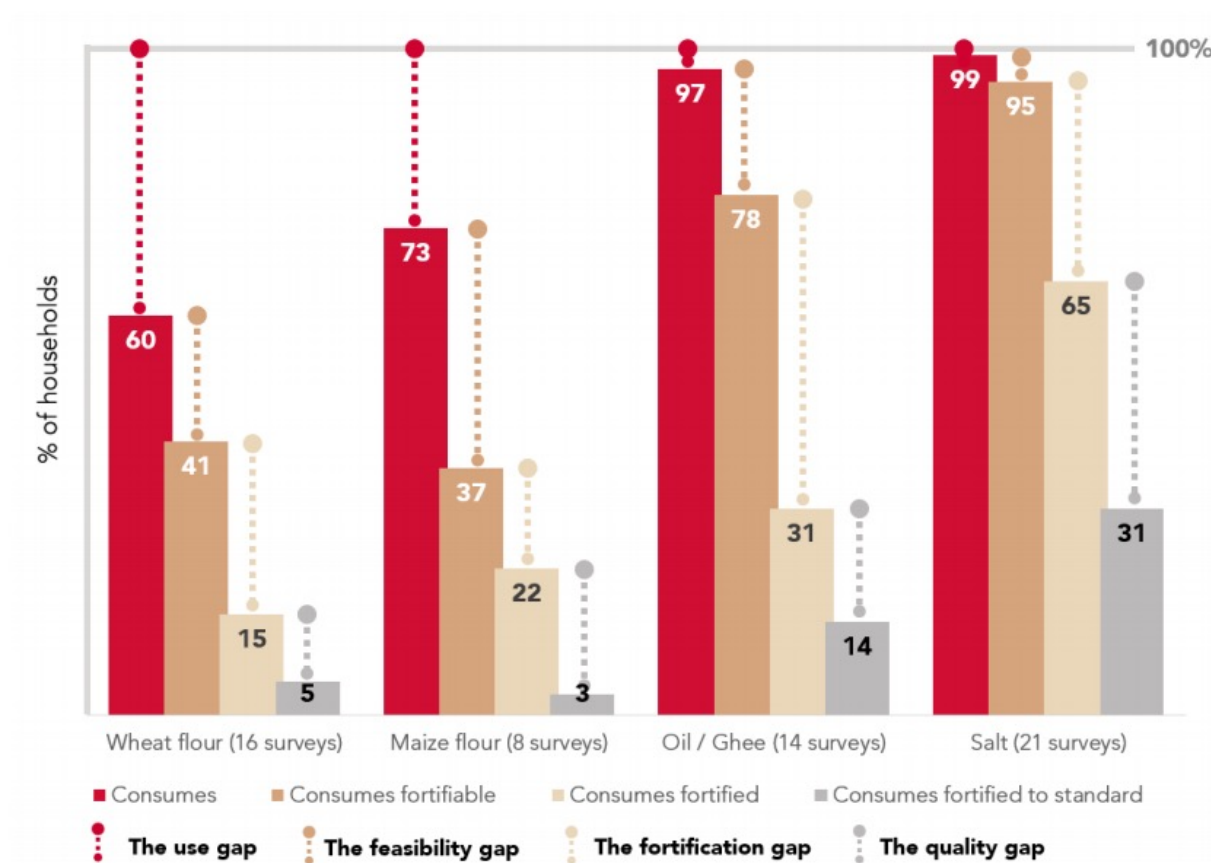
- Only 22% of industrially-milled grains and a much-lesser proportion of industrially-milled oil are currently fortified*
- There is a huge opportunity to improve fortification in industrially-milled grains



* **Source:** Data/estimates received by FFI (for cereal grains) and GAIN (for oil)



Fortification and quality gaps (coverage & compliance) – Global



Source: Adapted from Mkambula, P.; et.al The Unfinished Agenda for Food Fortification in Low- and Middle-Income Countries: Quantifying Progress, Gaps and Potential. *Nutrients* **2020**, 12, 354.

Fortification challenges

- Lack of political will and fortification legislation
- Inadequate fortification standards, also not harmonized across regions or sub regions
- Limited coverage, compliance and impact assessment data
- Poor regulatory enforcement
- Low capacity of medium and small-scale industry partners to comply with standards
- Challenges with premix accessibility and availability



Fortification opportunities

- Evidence and need-based advocacy and support for strengthened policy/governance
- Assessment of feasibility and scope of fortification from an optimal mix of interventions perspectives, including complementarity between food fortification and biofortification
- Harmonization of standards
- Establishment/strengthening of fortification data and monitoring systems
- Context-specific capacity building support to government and industry for enforcement and compliance
- Better coordination and accountability between public and private players
- Innovation, research and development to promote fortification





Nutrition International's support in addressing fortification technical and program gaps

Strive to support design and delivery of **sustainable in-country programs in eight countries – through open market and social protection platforms:**

- Supporting enabling environment with government and fortification alliances
- Working with mills/industry partners

In 2020, Nutrition International **reached 250M additional people with adequately fortified staples and 460M with adequately iodized salt**





Conclusion

Large scale food fortification supports stronger and resilient food systems that contribute to nutritious, safe, affordable and sustainable diets for all, everywhere.

Programmatic priorities for LSFF

1. Consolidating progress and protect gains
2. Promoting situation analysis and data generation
3. Supporting collaboration - effective public and private sector engagement and better governance, greater accountability
4. Facilitating capacities
5. Strengthening monitoring and surveillance



Thank you!

Speaker- Dr. Ahmed Kablan



Senior science advisor at the Food Safety Division /Center for
Nutrition/Bureau for Resilience and food Security at USAID



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa



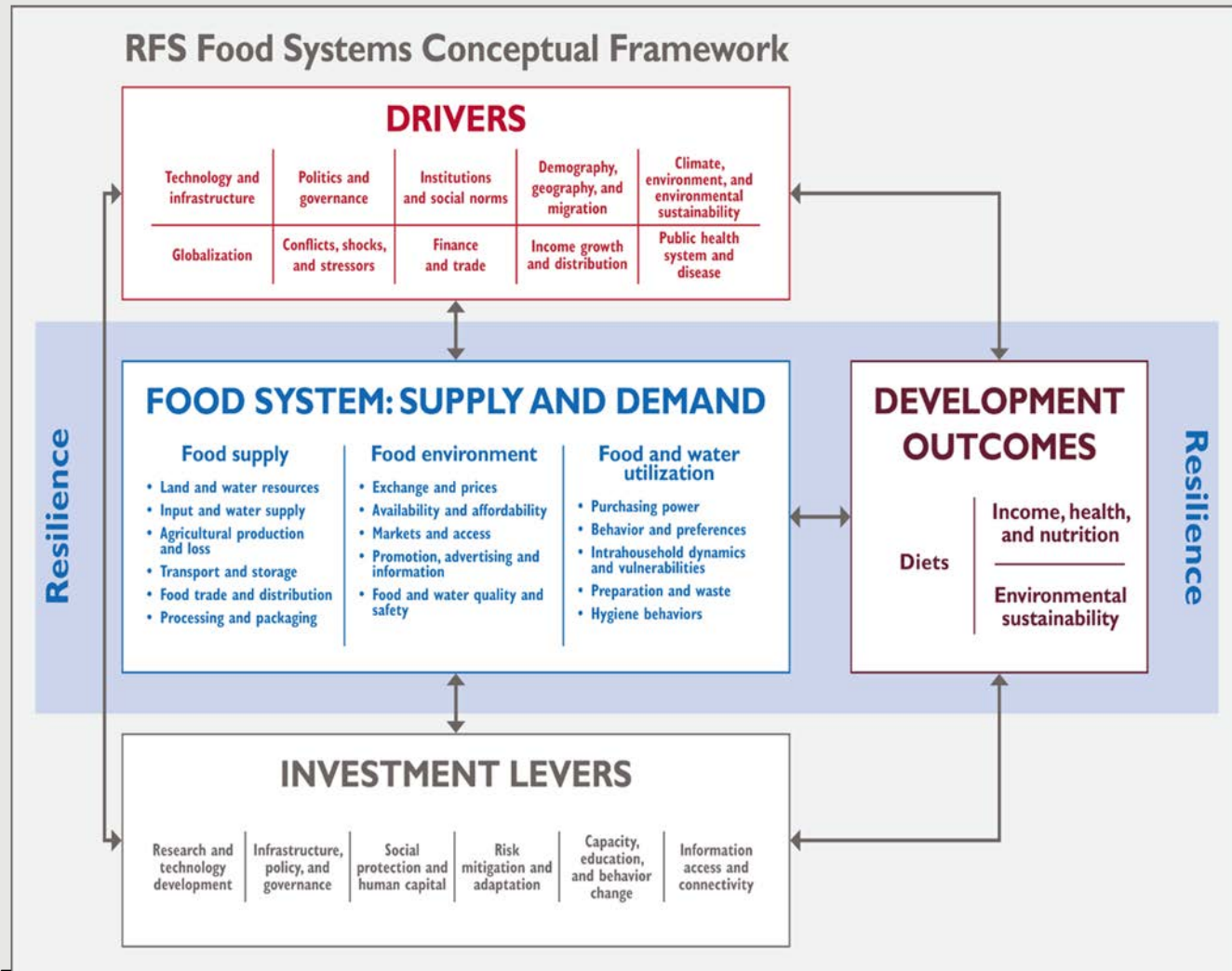
USAID
FROM THE AMERICAN PEOPLE

Improving Diets in the Food System

Ahmed Kablan, Senior Science Advisor,
USAID/RFS/CN
15 September 2021



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa



Complementary Approaches to Delivering Micronutrients



Optimal
breastfeeding



Supplementation



Diet diversification



Photo: HarvestPlus

Biofortification



Photo: GAIN

Large-scale food
fortification



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Unique Features of Large-Scale Food Fortification

- Proven potential to **improve the diets and nutritional outcomes of vast populations**, inclusive of low-, middle-, and high-income communities at a **very low cost**
- Once up and running, the vast majority of costs covered by industries and consumers
- Provides a **safety net against micronutrient deficiencies** that often occur seasonally or during times of crisis when food supply is low and/or not diverse
- Ease of uptake among target populations, since LSFF **does not require** consumer behavior change
- With trend of **increased processing of foods by industries**, LSFF has the potential to become more impactful over time



On the Horizon for Large-Scale Food Fortification at USAID

- Cross-bureau LSFF Working Group
- [LSFF Results Framework](#) & Programming Guide
- New Central LSFF Support Mechanism

Note: if you have any questions about USAID work on LSFF please contact Tim Quick tquick@usaid.gov, Omar Dary odary@usaid.gov, and Ingrid Weiss iweiss@usaid.gov





THANK YOU!

MERCI !

A close-up photograph of a person's hands shelling pink beans. The hands are positioned over a large, shallow, woven basket filled with many pink beans. Some beans are still in their green pods, while others are shelled. The person is using their fingers to peel the beans. The entire image has a blue color overlay. The text "Q&A Session" is written in a light orange font on the right side of the image, with a horizontal line extending from the left towards it.

Q&A Session

Speaker- Paulina Addy

Director, Women in Agricultural Development
Directorate, Ghana



Addressing Hidden Hunger Through Agriculture: Progress with Biofortification in West Africa

Speaker and Moderator- Esi Amoaful



A Public Health Nutritionist Director of Nutrition and
Country-lead for nutrition at the Ghana Health Service,
HarvestPlus Board Member

Please click on the link in the chat box for Mentimeter

What makes biofortification a reliable technology to address micronutrient malnutrition?



THANK YOU

