

Evidences

Study #4541

Contributing Projects:

- P335 - Monitoring and learning for biofortification

Part I: Public communications

Type: OICR: Outcome Impact Case Report

Status: Completed

Year: 2021

Title: Biofortified crops are sustainably integrated in Nigeria's food systems and benefiting approximately 13 million consumers

Short outcome/impact statement:

A review of the literature, monitoring, evaluation, and impact assessment data to date, and consultations with experts from the public and private sectors revealed that biofortified staples are fully embedded in the Nigerian food system. Biofortification is already benefiting approximately 13 million consumers, with potential to cover the entire country given the most recent developments in integration of biofortified seeds and grain in public policies and programs and increasing private seed and food sector interest and investment in biofortified products.

Outcome story for communications use:

Not required in the 2021 template

Links to any communications materials relating to this outcome: <Not Defined>

Part II: CGIAR system level reporting

Link to Common Results Reporting Indicator of Policies : No

Stage of maturity of change reported: Stage 2

Links to the Strategic Results Framework:

Sub-IDs:

- Increased availability of diverse nutrient-rich foods
- Increase capacity of beneficiaries to adopt research outputs

Is this OICR linked to some SRF 2022/2030 target?: Yes

SRF 2022/2030 targets:

- # of more people, of which 50% are women, without deficiencies of one or more of the following essentials micronutrients: iron, zinc, iodine, vitamin A, folate and vitamin B12
- # of more farm households have adopted improved varieties, breeds or trees

Description of activity / study: <Not Defined>

Geographic scope:

- National

Country(ies):

- Nigeria

Comments: <Not Defined>

Key Contributors:

Contributing CRPs/Platforms:

- A4NH - Agriculture for Nutrition and Health

Contributing Flagships:

- F2: Biofortification

Contributing Regional programs: <Not Defined>

Contributing external partners:

- Cato Foods
- GAIN - Global Alliance for Improved Nutrition
- BMZ - Bundesministerium für wirtschaftliche Zusammen-arbeit und Entwicklung / Federal

Ministry of Economic Cooperation and Development (Germany)

- HarvestPlus
- Government of The Netherlands

CGIAR innovation(s) or findings that have resulted in this outcome or impact:

In general terms, the two innovations related to this outcome story are vitamin A maize and vitamin A cassava for Nigeria, which may contain more than one variety that were released before the second phase of A4NH and cannot be linked to the CGIAR reporting indicators.

Innovations: <Not Defined>

Elaboration of Outcome/Impact Statement:

Evolution of the HarvestPlus-led biofortification program in Nigeria was documented and assessed through a comprehensive review of the published and grey literature, analysis of available data from HarvestPlus's monitoring and evaluation system, and semi-structured interviews with stakeholders in biofortified staple crop value chains.

With an aim to help reduce vitamin A deficiency in the country and to transform Nigeria's food systems to deliver accessible and affordable nutritious food for all, HarvestPlus kicked off its Nigeria biofortification program in 2010. The program focused on biofortifying Nigeria's two key staples, namely cassava and maize, with vitamin A. Through catalytic partnerships with CGIAR and National Agricultural Research and Extension Systems (NARES), as well as with the national public, private, and civil society sectors, at federal, state, and local levels, the Nigeria biofortification program reached a significant level of coverage and inclusion in national policies and programs for scaling to be considered sustainable.

By the end of 2021, six varieties of vitamin A cassava (VAC) and 10 varieties of vitamin A maize (VAM) were officially released for production, with iron pearl millet, zinc rice and zinc sorghum varieties either under testing or in the release pipeline. In 2021, an estimated 1.8 million households were growing VAC and almost 1.6 million households were growing VAM. Accounting for the overlap of the two crops among grower households, this translates into 13 million people with increased vitamin A intakes from consuming these staples.

CGIAR-funded research has shown the impact of VAM and VAC consumption on improving Vitamin A deficiency status [1, 2, 3] and related health outcomes [4, 5]. In addition, other CGIAR studies have demonstrated increasing adoption rates among farmers as a result of favorable agronomic traits of biofortified varieties and acceptance of and increasing demand for biofortified ingredients and food among processors and consumers alike [6, 7, 8]. The substantial body of evidence coupled with the significant delivery and coverage achieved to date has led to biofortification being increasingly integrated into national policies and programs.

An exponential increase in replacement of non-biofortified cassava and maize with VAC and VAM are expected in the coming years as a result of emphasis on investments in biofortification in the National Multi-Sectoral Plan of Action for Food and Nutrition (2021-25), Medium Term Development Plan (2021-30), and the National Agricultural Sector Food Security and Nutrition Strategy (2016-25) [8].

References cited:

- [1] Gannon, Bryan, Chisela Kaliwile, Sara A. Arscott, Samantha Schmaelzle, Justin Chileshe, Ngandwe Kalungwana, Mofu Mosonda, Kevin Pixley, Cassim Masi, and Sherry A. Tanumihardjo. "Biofortified orange maize is as efficacious as a vitamin A supplement in Zambian children even in the presence of high liver reserves of vitamin A: a community-based, randomized placebo-controlled trial." *The American journal of clinical nutrition* 100, no. 6 (2014): 1541-1550.014, Pages 1541–1550, (<https://doi.org/10.3945/ajcn.114.087379>)
- [2] Oparinde, Adewale, Abhijit Banerji, Ekin Birol, and Paul Ilona. "Information and consumer willingness to pay for biofortified yellow cassava: evidence from experimental auctions in Nigeria." *Agricultural Economics* 47, no. 2 (2016): 215-233. (<https://doi.org/10.1111/agec.12224>)
- [3] Ekeleme, Victor. HarvestPlus, Nigeria (22 August 2021). A Fair Bet: Promoting Biofortified Crops and Foods to Improve Livelihoods in Nigeria's Niger State. (<https://tinyurl.com/y3xvmkqo>)
- [4] Talsma, Elise F., Inge D. Brouwer, Hans Verhoef, Gloria NK Mbera, Alice M. Mwangi, Ayşe Y. Demir, Busie Maziya-Dixon, Erick Boy, Michael B. Zimmermann, and Alida Melse-Boonstra. "Biofortified yellow cassava and vitamin A status of Kenyan children: a randomized controlled trial." *The American journal of clinical nutrition* 103, no. 1 (2016): 258-267. (<https://doi.org/10.3945/ajcn.114.100164>)
- [5] Foley, Jennifer K., Kristina D. Michaux, Bho Mudyahoto, Laira Kyazike, Binu Cherian, Olatundun Kalejaiye, Okonkwo Ifeoma et al. "Scaling Up Delivery of Biofortified Staple Food Crops Globally: Paths to Nourishing Millions." *Food and Nutrition Bulletin* 42, no. 1 (2021): 116-132. (<https://doi.org/10.1177%2F0379572120982501>)
- [6] Afolami, Ibukun, Martin N. Mwangi, Folake Samuel, Erick Boy, Paul Ilona, Elise F. Talsma, Edith Feskens, and Alida Melse-Boonstra. "Daily consumption of pro-vitamin A biofortified (yellow) cassava improves serum retinol concentrations in preschool children in Nigeria: a randomized controlled trial." *The American journal of clinical nutrition* 113, no. 1 (2021): 221-231. (<https://doi.org/10.1093/ajcn/nqaa290>)
- [7] Palmer, Amanda C., Katherine Healy, Maxwell A. Barffour, Ward Siamusantu, Justin Chileshe, Kerry J. Schulze, Keith P. West Jr, and Alain B. Labrique. "Provitamin A carotenoid–biofortified maize consumption increases pupillary responsiveness among Zambian children in a randomized controlled trial." *The Journal of nutrition* 146, no. 12 (2016): 2551-2558. (<https://doi.org/10.3945/jn.116.239202>)
- [8] Palmer, Amanda C., Justin Chileshe, Andrew G. Hall, Maxwell A. Barffour, Ngosa Molobeka, Keith P. West Jr, and Marjorie J. Haskell. "Short-term daily consumption of provitamin a carotenoid–biofortified maize has limited impact on breast milk retinol concentrations in zambian women enrolled in a randomized controlled feeding trial." *The Journal of nutrition* 146, no. 9 (2016): 1783-1792. (<https://doi.org/10.3945/jn.116.233700>)

Quantification: <Not Defined>

Gender, Youth, Capacity Development and Climate Change:

Gender relevance: 0 - Not Targeted

Youth relevance: 0 - Not Targeted

CapDev relevance: 0 - Not Targeted

Climate Change relevance: 0 - Not Targeted

Other cross-cutting dimensions: NA

Other cross-cutting dimensions description: <Not Defined>

Outcome Impact Case Report link: [Study #4541](#)

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