

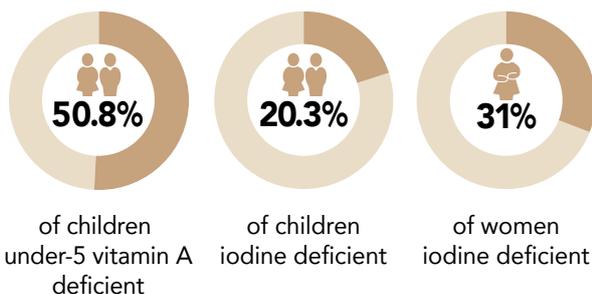
Changing Bangladesh's future -

a digital solution to guarantee nutritional quality of staple foods

PREMISE #1:

A national nutrition challenge

Micronutrient deficiencies continue to persist in Bangladesh. According to the latest National Micronutrient Survey 2019-2020:¹



These nutritional deficiencies result in both health and economic problems:

- Vitamin A deficiencies can cause blindness, increase the risk of maternal mortality and result in higher risk of infection.^{ii, iii}
- Iodine deficiency can lead to goiter, impairment of cognitive function, and impede learning ability in children.^{iv}
- The World Bank estimates Bangladesh loses over US\$700 million in GDP to vitamin and mineral deficiencies.^v



PREMISE #2:

A solution through food fortification

Fortification of Edible oil with Vitamin A has been mandatory in Bangladesh since 2013, while salt fortification with iodine has been mandatory since 1989. Global studies show food fortification can protect 3 million children globally from vitamin A deficiency. National salt iodization programs contribute to a 74% reduction in the odds of goiter and a significant reduction in iodine deficiency.^{vi}

In order to have the intended impact on micronutrient deficiency, fortified foods must meet national fortification standards. A significant challenge in Bangladesh is the fortification quality of bulk or drum oil, which makes up approximately two thirds of the edible oil market. A recent study found that only 7% of bulk oil met Bangladesh's national fortification standard for vitamin A.^{vii}

PREMISE #3:

Food fortification is falling short of its intended impact

Monitoring the quality of fortified foods has traditionally been a manual, time-consuming process, which relies primarily on sporadic testing once products have reached the market. Testing products after they are packaged can be wasteful, and results come too late to correct problems on the production line, as products are already at the point of purchase.

THE SOLUTION

Automating data collection during the production process is much more efficient than sporadic testing. Specialized technologies and devices can be used at the factory to quickly gauge whether products will meet national standards. This production process data can be verified using on-site testing devices, which produce results in less than 20 minutes.

A partnership of international specialists and experts is working with Bangladesh's food producers to develop a platform of sensors and software, enabling oversight of the production process and product quality at every point along the fortification value chain.

Food fortification requires a partnership between the public and private sectors to achieve a health impact. Likewise, the monitoring of fortification quality will benefit from a partnership with the information technology sector.

Organisations involved in this initiative include:

Ministry of Industries (MoInd) of the Government of Bangladesh, leading the national fortification programs of edible oil and salt. Bangladesh Standard and Testing Institution (BSTI) under MoInd is responsible for the standardization, quality assurance (QA) and quality control (QC) of fortified foods.

The Global Alliance for Improved Nutrition (GAIN), coordinating the pilot with MoInd and businesses in Bangladesh as part of its global large scale food fortification (LSFF) programme in support of better nutrition for all;

Hewlett Packard Enterprise, a leader in data system development, technology solutions, and analytical software;

BioAnalyt, the world's leading innovator in one-the-spot food nutrient tests;

BASF and **DSM**, two of the world's largest manufacturers of the vitamin and mineral premix used in fortified foods;

GH Labs, building tools and technologies to address unmet needs in the health sector; and

Camelot Consulting, specializing in data security and data system technologies.

Together with the Government of Bangladesh, businesses and food producers will be supported to adopt a new digital system which will provide:

- i. Capacity development for government, inspection officials and businesses to ensure Quality and Compliance of Large-Scale Food Fortification
- ii. In-line sensors to measure process flow and ensure correct dosing
- iii. Doser sensors to ensure the correct premix weights are added and dispensed
- iv. In-line product testing for nutrient levels
- v. Tracking of foods through transport and distribution
- vi. Market-level testing for nutrient levels
- vii. Tracking of premix with 2 dimensional QR code labels that hold quality certificates, composition data, dates of production and more
- viii. Software platforms and analytics to capture data and show where problems are arising, such as excessive storage times leading to nutrient breakdown, or variable process flows.

This system will equip producers to:

- Manage inventory
- Use resources more efficiently
- Course-correct in real time
- Map distribution
- Prevent stock-outs
- Identify equipment and maintenance issues
- Provide data as proof of quality and impact
- Enhance brand reputation and financial performance
- Benchmark against other producers.



The platform is designed to give producers complete privacy and control over their data, benchmarking against the performance of competitors where this is desirable. The partnership is supporting development of the system, but it does not control, own, or have access to the data on the system.

The project aims to pilot digital systems with three refineries and based on this experience, support digital systems for a cohort of more than 15 fortified food producers in Bangladesh, as well as for the government agencies who monitor large scale food fortification.

i. Icdrrb,b., Dr. Aliya Naheed, National Micronutrient Survey in Bangladesh 2019-2020 Draft Final Report.

ii. <https://documents1.worldbank.org/curated/en/994581468200681224/pdf/772170BRI0Box00angladesh0april02011.pdf>

iii. <https://www.who.int/data/nutrition/nlis/info/vitamin-a-deficiency>

iv. http://apps.who.int/iris/bitstream/handle/10665/136908/9789241507929_eng.pdf;jsessionid=80315B826304BB3FCB3053A83A79D506?sequence=1

v. [National Micronutrient Survey 2011-12.pdf.pdf \(unicef.org\)](#)

vi. Keats et al. 2019 <https://doi.org/10.1093/ajcn/nqz023>

vii. <https://pubmed.ncbi.nlm.nih.gov/33670884/>