

Leveraging Business Partnerships for Large-Scale Food Fortification

A Case Study on Innovative Strategies to Address Micronutrient Deficiencies in Kenya, Nigeria, and Tanzania

ACHIEVEMENTS



Increasing the availability of vitamin A-fortified sugar by more than 200%, making it available to 96% of the Nigerian population.

Reaching over
125.5
million people



Increasing the availability of wheat flour fortified with iron and folic acid in Kenya by 29%, reaching 66% of the population.

Reaching over
39.3
million people



Increasing the supply of fortified wheat flour in Tanzania.

Reaching over
86.3
million people

Summary

Micronutrient deficiencies affect billions of people globally, particularly in low and middle-income countries, leading to serious health issues. However, a proven, cost-effective, and evidence-informed solution exists: Large-Scale Food Fortification (LSFF).

Fortification is the process of adding essential vitamins and minerals to staple food products to improve their nutritional quality, helping to address micronutrient deficiencies and improve overall health outcomes of national populations. This report explores an innovative, business-centered model that has successfully increased the availability and accessibility of fortified foods like flour, cooking oil, and sugar in Kenya, Nigeria, and Tanzania, reaching millions of people and effectively benefiting their health outcomes.

Vitamins and minerals are needed by the body to perform a range of functions, including enabling the production of enzymes, hormones, and other substances essential for normal growth and cognitive development. **Currently, the insufficient consumption of iron, vitamin A, and iodine is prevailing among low and middle-income countries, particularly in children and pregnant women who are at high risk of developing dangerous health conditions and diseases.** For example, the World Health Organization (WHO) estimates that more than half a billion women of reproductive age globally suffer from **anemia**,

as do more than 250 million children between the ages of six and 59 months — potentially leading to varying degrees of physical and cognitive stunting. The WHO also estimates that **Vitamin A** deficiency causes blindness in up to 500,000 children annually.

Food fortification is an **evidence-informed approach** to preventing, reducing, and controlling micronutrient deficiencies in the general population, and over 140 countries currently mandate the fortification of one or more food vehicles, indicating strong, widespread political support for the inclusion of LSFF in national nutrition strategies.

Depending on the food and the specific vitamins and minerals added, **fortification costs only \$0.05 to \$0.25 per person per year**, making it one of the most cost-effective ways to address micronutrient malnutrition. Furthermore, savings to a nation's healthcare system are many times the cost of a standard food fortification program. In Tanzania, for example, the World Bank calculated that deficiencies in iron, Vitamin A, and folic acid cost more than **US\$518 million (2.65% of GDP)**.

Global efforts to promote fortification have typically centered on engaging regulators and other stakeholders in the public sector, but despite these investments, compliance with fortification standards has remained very low in many countries. This case study presents an innovative, business-centered approach first undertaken in the Strengthening African Processors of Fortified Foods (SAPFF) program.

This program was designed and implemented by TechnoServe in partnership with the Bill & Melinda Gates Foundation and centered its efforts on building the commitment of the private sector and leveraging effective partnerships to sustain it.

Key elements of the program included establishing a baseline understanding of existing gaps in compliance, identifying and prioritizing the engagement of different stakeholders, and building solid partnerships with businesses to have an open and honest discussion about their actual fortification status, challenges, goals, and opportunities in the market. The design and implementation of technical assistance and business development projects were built during those discussions.



Photo credit: Woman standing in a food processing facility holding a bag of sifted maize meal

Introduction

Fortifying commonly consumed foods with micronutrients offers a cost-effective solution that can reach a large portion of the population, especially those that are widely considered to be vulnerable. Not only does reducing the burden of morbidity and mortality result in benefits, but it also leads to improvements in school performance at an early age, and productivity that can positively contribute to broader economic growth. Yet three billion people suffer from a lack of essential vitamins and minerals — or “micronutrient deficiencies” — which can result in devastating health impacts such as blindness, physical and cognitive stunting, debilitating disease, and the preventable deaths of more than three million children worldwide each year. Ensuring that everyone can consume foods rich in vitamins and minerals is foundational to building a healthy food system.

The fortification of staple foods has become increasingly important in times of rising food prices and climate change, particularly for people in low-income communities who may struggle to afford varied diets. With the global population expected to reach 9.7 billion by 2050, and climate change impacting food production and availability, fortification can be an effective and affordable way to ensure that people have access to the nutrients they need to live healthy lives.

Every \$1 invested in fortification generates \$27 in economic return from prevented disease, improved earnings, and enhanced work productivity. For example, the improved iodine status achieved through salt iodization in 159 countries represents an economic benefit of more than \$32 billion annually.

These financial returns exceed those of even other critical public health interventions, such as vaccination, which has a return of approximately 16:1.

Delivering nutritious food is increasingly becoming a critical priority for rapidly growing low- and middle-income countries, and mandatory fortification of widely consumed staple foods has been the traditional approach to improve the intake of essential micronutrients. This has yielded very mixed success, however, because it has historically failed to effectively engage the food processors that are essential in producing safe and high-quality food that is accessible to base-of-the-pyramid consumers.

A multi-stakeholder approach is central to creating an integrated ecosystem for LSFF. Staple food processors are an integral component of the food system, and efforts to ensure improved consumer access to adequately fortified foods must include working with these businesses to improve their technical capabilities, motivate their compliance, and bolster the enabling environment that sustains their good quality performance.

TechnoServe, through its program Strengthening African Processors of Fortified Foods (SAPFF), presented an industry-led approach deeply rooted in addressing core business challenges while also emphasizing the value add of institutionalizing sustainable fortification practices. The program fostered win-win partnerships with the private sector to advance food fortification in Nigeria, Kenya, and Tanzania between 2016 and 2022, leveraging B2B linkages that also facilitated interventions to scale.

These countries have very different food processing industries, and SAPFF's approach was tailored to the unique characteristics of each market. Across all three countries, however, SAPFF worked to strengthen the capacity of food processors, engage governments and industry associations, and forge new collaborations and partnerships to promote the competitive, cost-effective, and sustained production of fortified foods at a large scale.

Elements to the approach

Data Collection and Ongoing Monitoring

Accurate and timely data is an essential component of successful LSFF strategies and was an important factor in informing the program's adaptive improvements. Not only did it provide the program team with a nuanced understanding of the food sector in each country and yield valuable ongoing information to drive engagements with the private sector, government, and civil society, it was vital for securing buy-in from processors.

At the outset, SAPFF established a comprehensive database of information through a testing methodology that collected composite samples of edible oil, salt, sugar, and wheat flour products from markets across the countries. The program collected 246 composite samples of various food vehicles and assayed them for the baseline exercise between January and February 2018. The composite samples were made from 724 stock-keeping units (SKUs) representing 206 brands and 130 companies.

The baseline survey served several important functions:

- Selection and prioritization of companies to target for customized technical support
- Identifying potential causes for non-compliance with standards

- Generating data used to create awareness of the brand's performance in the market as well as to engage with the processors to improve product quality, particularly compliance with fortification standards

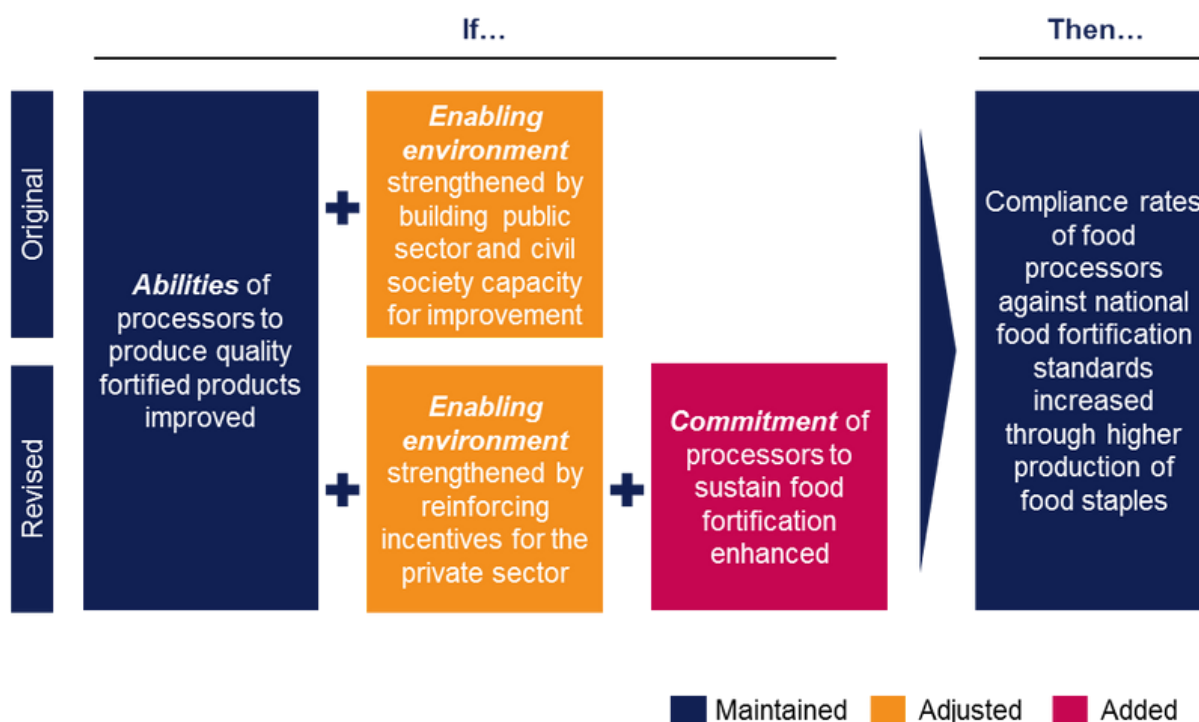
Establishing a baseline understanding of existing gaps in compliance allowed SAPFF teams in the field to gain access to production facilities to conduct diagnostics based on confidentiality. The SAPFF program had to carefully frame its messaging to companies to make sure it was not perceived as siding with regulators. Knowing the size of the compliance gap allowed teams to craft preliminary strategy plans and present them in subsequent meetings with each company. Building trust remained a critical aspect of the program's engagement strategy.

Prioritizing Food Processors

Throughout all stages of the program, SAPFF assessed the following three criteria to determine how to prioritize companies and tailor the approach to engage with them: (a) the implied market share- based on actual brand production figures and national consumption estimates; (b) the current degree of compliance (based on SAPFF baseline survey), and (c) management's attitude (based on a qualitative assessment of willingness to engage with SAPFF).

Supporting Fortification through Behavior Change

When the SAPFF team began talking with various industry actors, they quickly discovered that the assumption that narrowing the industry's technical knowledge gaps would automatically lead to higher fortification was incorrect. Instead, they discovered that initiatives to promote behavior change, which go beyond technical assistance programs alone, would be a critical factor. The theory of change evolved to combine the original approach of strengthening processor technical capacity with a new focus on changing behavior toward fortification, which proved to be more complex, time-consuming, and resource-intensive than anticipated and required both senior- and technical-level buy-in.



Developing Abilities through Technical Assistance (TA)

The program recognized that in order to engage with food processors, particularly larger companies, the scope of technical assistance (TA) needed to be expanded beyond the narrow fortification and related business management practices. The program broadened the scope of TA to support improved fortification outcomes, food or human safety, and business development. The provision of technical assistance was categorized into three areas:

- Fortification projects** — These projects primarily encompassed: improved access to higher quality premix, support product quality or marketing improvements, and reduction of plant wastage.
- Food and occupational safety projects** — Many projects in this category focused on developing quality assurance (QA) and quality control (QC) processes and supporting infrastructure, typically establishing or improving laboratory facilities.
- Business development projects** — Included product rebrandings and efficiency projects, such as introducing information management systems, plant layout improvements, milling process improvements, and credit management support.

The projects proved critical to SAPFF improving its value proposition and offering assistance aligned with the interests of the processors. They also allowed SAPFF to build relationships and credibility to discuss fortification, particularly given the little interest among processors in food fortification.

SAPFF worked closely with management and workers to identify the scope of the project, supported processors on business development to address pressing business challenges with direct bottom-line impact, and improved operational efficiency to generate savings. By doing so, the company was able to cover any costs required to close fortification compliance gaps and support product quality or marketing improvements, leading to market growth and increasing the ability of its fortified products to penetrate untapped portions of the market in new regions.

Overall, the SAPFF program's approach was to provide technical assistance in a customized and flexible way, which allowed processors to address their specific needs while indirectly contributing to the company's commitment and fortification ability.

Creating a Supportive Enabling Environment

SAPFF emphasized the support of self-regulatory initiatives that allow for compliance performance to be owned by the industry. This was piloted and eventually scaled in Nigeria under a voluntary mechanism that was co-created with industry leaders known as the Micronutrient Fortification Index (MFI).

Sustaining large-scale and good-quality food fortification required strategies that

incentivized food processors to invest in and consistently meet national food fortification standards where they existed.

Building Commitment towards Behavior Change

Building real commitment with accountability metrics in place was also a critical factor in the success of food fortification across the region. The implementation of a comprehensive and effective fortification program required the involvement of multiple stakeholders, including government agencies, food processors, and industry associations.

The first approach centered around the creation of a CEO Forum and Inter-ministerial Roundtables (IMR), where stakeholders from different places of the industry came together to discuss the importance of fortification. The second approach involved engaging with companies that held significant portions of the market to establish a Micronutrient Fortification Index (MFI) that would rank their efforts around fortification and increase transparency. We'll explain both approaches in greater detail.

CEO forum, Inter-ministerial Roundtable (IMR), and Engagement with Industry Associations

The CEO forum was influential in generating commitment and buy-in at the highest level in Nigeria through frank discussions between senior government officials/ministers and company CEOs. This event was co-convened by TechnoServe, Aliko Dangote, Bill Gates, and the federal government of Nigeria—represented at the highest level by H.E. Vice-President Yemi Osinbajo.

The SAPFF Program regularly provided compliance progress updates during these meetings, allowed organizations to reflect on their status relative to their peers, and positioned the conversation as a cross-sectoral priority.

As a result of the inaugural meeting in 2018, a series of commitments were captured in the form of a communique (signed by all participants in attendance) that outlined collective actions that needed to be pursued to realize industry goals and objectives. Specifically, industry commitment was to incorporate food fortification as a key performance indicator in the corporate measurement framework, with regular reporting to the CEO and board beginning in 2018 and a standard reporting and review of progress at an industry-wide level to improve compliance with fortification regulations.

Additionally, SAPFF held an Inter-ministerial Roundtable in collaboration with The Federal Ministry of Industry, Trade, & Investment (FMITI) in Nigeria. It disseminated relevant project studies such as The Business Case for Fortification, Landscape Study of Vitamins and Premix for Food Fortification in Nigeria, and Edible Oil Study - The Opportunity for Oil Fortification with Vitamin A2. These documents informed the policy recommendations subsequently presented during the 2019 CEO Forum. Additionally, the insights and feedback gathered during the IMR meeting were comprehensively captured and incorporated into detailed documentation distilled into this case study.

Engaging with government stakeholders served as a springboard to the next phase

of fulfilling their commitment to enabling the development of robust policies. Furthermore, and in line with the program's commitment to exploring effective partnerships, SAPFF fostered a stronger relationship with the Flour Milling Association of Nigeria (FMAN) and held discussions with the chairman to examine ways that the innovative self-regulatory tool of the Micronutrient Fortification Index (MFI) could be more practical in application and positively received.

The Micronutrient Fortification Index (MFI)

A standardized Micronutrient Fortification Index (MFI) piloted in Nigeria provided a public ranking of fortified branded products for each participating company based on a score aggregating the effectiveness and efficiency of the company's systems and levels of product fortification. The MFI demonstrated the significance of brands as a focal point for investment and industry accountability in food fortification and the power of harnessing the competitive nature of businesses to drive their food fortification performance.

The initiative started with a pilot consisting of well-known brands of four companies and later expanded participation to 15 companies — representing 31 brands — that completed the first full ranking cycle. The publicly listed brands on the index now cover approximately 80% of the flour milling market, 40% of the edible oils market, and 88% of the sugar market in Nigeria, reaching over an estimated 134 million people in the country in 2022.

The index consists of three main components:

1. The Industry Expert Group (IEG) provides ratings and advice to the MFI Governing Board.
2. Product Quality Testing assesses compliance of participating companies' products.
3. The Self-Assessment Tool (SAT) evaluates quality management systems and governance based on the framework's indicators with different weights assigned to each component.

The data inputs were made through company-owned digital portals, and the results were published on a secure, web-based public portal which also served as a gateway for stakeholders to access related information on micronutrient fortification and food quality.

The ultimate aim of the MFI was to both leverage private sector efforts to digitalize quality assurance and business processes linked to industrial automation and to harness their competitiveness through voluntary participation in the index to drive improved food fortification performance based on industry best practices and quality benchmarks.

Since large-scale food fortification (LSFF) is a fundamental part of national strategies to address micronutrient deficiencies, harnessing the competitive nature of businesses by using a data-driven and digitally enabled MFI brand ranking leads to strengthening the factors affecting food processors' compliance with national fortification standards.

In addition to continuous cross-sectoral engagement to enhance the enabling environment, this platform was also leveraged by the industry to catalyze data-driven decision support by companies' leadership and obtain an optimal index of a company's contribution to the national fortification plan, which also served to level the playing field among competitors.

The overall component-based index also enhanced industry accountability by providing an incentive for streamlining policy and developing concerted strategies, including industry-driven approaches to quality assurance that complemented government regulation and enforcement.

Strategy in Motion through Food Fortification



SAPFF Intervention Examples

The industry shift towards fortification was not monolithic. While Nigeria has a more consolidated sector with large businesses that produce large amounts of food and consequently hold significant portions of the market, Kenya and Tanzania have more fragmented markets with larger numbers of small companies that hold smaller portions. These key differences required that the SAPFF team adjust solutions to the local context as the most effective path towards fortification. Here are a few examples of local solutions:

Nigeria

Nigerian cooking oil producer PZ Wilmar was one of the first millers to partner with SAPFF, and the engagement has allowed the company to reach more consumers with adequately fortified products and strengthen its image around quality.

In 2010, PZ Cussons International and Wilmar International, Ltd. formed a partnership to launch PZ Wilmar in Nigeria. Located in Lagos, PZ Wilmar's facility can produce 1,000MT of cooking oil daily. In aggregate, its brands have leading market shares in the Edible Oil Segment, and the company has been deeply committed to quality and nutrition.

While PZ Wilmar had been fortifying its cooking oil, a baseline analysis by the SAPFF team found that the Vitamin A levels in its products were inconsistent. Based on these findings, the firm worked with SAPFF to identify areas for improvement. The ultimate objective was to extend the optimal benefit of fortified oil to the millions of consumers benefiting from PZ Wilmar's appropriately fortified brands.

The SAPFF team provided in-plant training to PZ Wilmar's personnel, focusing on fortification, good manufacturing practices, and quality assurance and control.

In order to effectively measure the fortification level in its own products and course-correct as needed, PZ Wilmar used SAPFF's matching grant facility to purchase an iCheck chroma machine to measure Vitamin A levels during the production process.

PZ Wilmar was one of the first firms to participate in the MFI, and two of its brands, Mamador and Devon King's, have consistently been recognized as top performers in the rankings. PZ Wilmar has remained highly committed to the cause of fortification, with its brands consistently ranking within the top 10 of the index.

The company actively participates in all key events and has signed up as one of the three pilot producers for the Digital Fortification Quality Traceability Plus (DFQT+) program in Nigeria. This dedication to delivering quality and nutritious food remains evident in the quarterly product quality assessments conducted by TechnoServe.

Kenya

Mombasa Maize Millers is the largest wheat flour and maize flour miller in Kenya. It started operations in 1978 and, since then, has expanded and grown to eight production sites spread across the country with a total combined annual capacity of 602,400MT of maize and 321,600MT of wheat. The company is an active member of the Cereal Millers Association, an association of large millers in the country.

Mombasa Maize Millers was onboarded to the SAPFF program in 2018 during an opportunity-mapping meeting at their Kingorani plant in Mombasa, where the team had gone to pitch the program and share baseline results that showed the company was largely compliant with most brands.

Plant assessment in their Kingorani plant identified four main areas of technical assistance:

- Fortification efficiency and monitoring
- Dust Management at grain reception
- Finished product loading
- Millet cleaning
- New product Development-Semolina Flour shelf life analysis and porridge flour for infants
- ISO22000 certification

As a next step, a team of experts from TechnoServe worked on the areas identified and made recommendations which were assessed by looking at the cost-benefit analysis of the investments required for commercial viability and sustainability.

The SAPFF program conducted in-plant training to build the production and quality control capacity of staff handling the fortification process. It also worked in the fortification of three brands that, at baseline, were not meeting standards.

SAPFF established a monitoring system to help track the process and supported the acquisition and installation of a micro feeder to address inconsistencies in premix dosing. The latest results from Mombasa Maize indicate that all brands reached the 80% threshold required to reach full fortification compliance.

Tanzania

GAKI Investment Limited is a family-owned cottonseed oil factory established in 1996 in Shinyanga (Tanzania), that has a production capacity of 15 metric tonnes of edible cottonseed oil per day.

The assistance undertaken by GAKI included methodologies like conducting a site visit and plant assessment first, designing scoping calls and quick wins, participation in sector-wide training, and technical advice.

Through SAPFF's technical assistance, GAKI achieved 100% micronutrient-compliant oil that meets national standards. The most impactful driver was the new and codified knowledge both management and workers acquired from SAPFF, which allowed them to fortify their cooking oil.

The learnings from SAPFF, through three sector-wide training, focused on carrying out the correct steps in the fortification process. SAPFF delivered helpful information on:

- How to source a Vitamin A supplier, as GAKI did not know where to find one
- How to mix Vitamin A in the FF unit and tank

- The plant layout for the Vitamin A tank,
- How to design and install the Vitamin A tank,
- Formulating standard operating procedures (SOPs) and good manufacturing practices (GMPs).

The training and knowledge sharing drove motivation, upholding SAPFF's theory of change that posits that if 1) the commitment of food processors to close existing gaps in their food fortification practices is improved and 2) their abilities to competitively comply with food fortification standards are strengthened, and 3) the external enabling environment is better able to reinforce incentives for

the private sector to comply with these standards, then compliance rates of private sector food processors against national food fortification standards will be increased through higher production of fortified food staples.

Since fortifying its oil, GAKI Oil has increased its market penetration from 50% to 75-80%. GAKI Oil was also able to sell an additional 239,140 liters of cooking oil that the government would have otherwise disposed of due to a lack of essential micronutrients, specifically Vitamin A. However, with the support of SAPFF's technical assistance, the oil was successfully fortified and allowed to be sold.

Conclusion

Through the SAPFF program's implementation, TechnoServe:

- Created a standardized Micronutrient Fortification Index (MFI) with a pilot of well-known brands of four (4) companies and expanded participation to 15 companies – representing 31 brands - that completed the first full-ranking cycle. The publicly listed brands on the index cover approximately 80% of the flour milling market, 40% of the edible oils market, and 88% of the sugar market in Nigeria, reaching more than an estimated 134 million people in the country in 2022.
- Hosted a regional workshop with 53 participants (23 in Lagos and 30 in Owerri) representing national edible oil processors and premix suppliers. BioAnalyt, the producer of the innovative on-the-spot iCheck devices for measuring vitamin A jointly with a major vitamin A supplier, presented strategies to enable local capacity to monitor food fortification programs effectively by delivering analytical equipment, quality control, and monitoring protocols customized for the local use, and on-the-ground training.
- Engaged 33 food processing companies in the fortification of maize/wheat flour
- Developed 188 customized technical assistance programs: mill audits, calibrations, cost analysis, quality assurance, and quality control
- Conducted 18 In-plant trainings
- Facilitated six sector-wide trainings in Kenya, and seven in Nigeria and Tanzania respectively
- Distributed \$83,064 in matching grants toward fortification equipment
- Carried out eight project studies: market surveillance, premix analysis, flour yellowing, aflatoxin studies, the business case for fortification
- Hosted three CEO Meetings/Forums

By fortifying staple food items with essential vitamins and minerals, the SAPFF project made significant strides in improving the micronutrient status of the population in Nigeria. Specifically, the availability of sugar fortified with Vitamin A increased by over 200%, reaching 96% of the population and making it accessible to 125.57 million more people. In addition, the supply of wheat flour fortified with iron and folic acid increased by 29%, reaching 66% of the population and making it available to 39.3 million more people in Kenya. The project also increased the supply of fortified wheat flour in Tanzania, reaching more than 86.3 million people.

The project also established the Micronutrient Fortification Index, a self-regulatory platform for companies to measure their progress against national standards, and helped bring Nigeria's three regulatory agencies together in a new commitment to work efficiently in support of industry efforts and consumer expectations through the Joint Regulatory Framework.

TechnoServe, through its program, proved the relevance of taking a different approach deeply rooted in business, where win-win partnerships with the private sector to advance food fortification remained at the forefront of the initiative. With your support, we can continue to push forward the fight against micronutrient deficiencies amongst the most vulnerable and the transformation towards attaining food safety and quality accessible to the overall population in the global south.



Photo credit: Riccardo Niels Mayer