Accelerating Food and Nutrition Security through Food Fortification:
A private sector playbook

World Business Council for Sustainable Development

Eat Well Global

Contents

Definitions

Biofortification	Increasing the nutrient density of food crops through conventional plant breeding, improved agronomic practices and modern biotechnology.[1]
Fortification (or enrichment)	The practice of deliberately increasing the content of one or more essential nutrients in a food to improve its nutritional quality and provide public health benefits with minimal risk to health, regardless of whether those nutrients are naturally present in that food.[2,3]
Large-scale (or mass) food fortification (LSFF)	Adding essential micronutrients to foods commonly consumed by the general public, such as cereals, condiments and milk. The government sector often instigates, mandates and regulates LSFF and it is almost always mandatory.[4]
Mandatory fortification	When governments legally oblige food producers and manufacturers to fortify certain foods with specific micronutrients, ensuring the availability of selected micronutrients in constant supply.[5]
Market-driven fortification	The voluntary initiative of food producers and manufacturers to add specific amounts of one or more micronutrients to processed foods. Although voluntary, market-driven fortification usually operates in government-set regulatory limits and can complement mandatory fortification efforts by providing micronutrients that would be difficult to add through mandatory fortification due to safety, technological or cost constraints.[6]

Executive summary

Our food systems are caught in the crosswinds of a shifting climate, escalating hunger and malnutrition, and deep-rooted social inequalities. Yet, within this challenge lies a powerful opportunity – to reshape food systems so they deliver nutritious food in a fair and sustainable way. Food fortification is one important solution that can bridge micronutrient gaps and enhance global food and nutrition security, but it also comes with complex challenges. Businesses face both internal and external obstacles that can slow progress. However, targeted strategies, consumer-centric products, and strong cross-sector partnerships can help businesses accelerate fortification initiatives and contribute meaningfully to global food and nutrition security.

This playbook highlights real-world challenges that hinder fortification efforts and explores practical solutions to overcome them, in order to build sustainable business models that drive better public health outcomes. Rather than offering an exhaustive academic review, it provides a focused exploration of business perspectives on fortification-related challenges, opportunities, and areas where greater alignment is needed to enhance food and nutrition security. The goal is to inspire collaboration across the value chain and create a springboard for action. The playbook offers insights into the following elements:

Foundations

Establishing strong foundational elements is crucial for impactful fortification efforts. Achieving food and nutrition security through fortification initiatives requires a collaborative, data-driven and consumer-focused approach that aligns public health goals with sustainable food systems, while ensuring fortified food products remain accessible, effective and appealing to diverse population groups. By anchoring strategies in evidence-based data and aligning them with consumer needs and behaviors, fortification efforts can deliver meaningful public health outcomes.

Barriers

Despite its proven potential to address micronutrient deficiencies and improve public health, food fortification faces significant barriers to adoption and impact. Success depends on overcoming these barriers: improving consumer awareness, reducing costs, harmonizing policies and enforcing standards. Achieving this requires coordinated efforts from governments, the private sector and civil society to ensure fortification initiatives are accessible, impactful and sustainable.

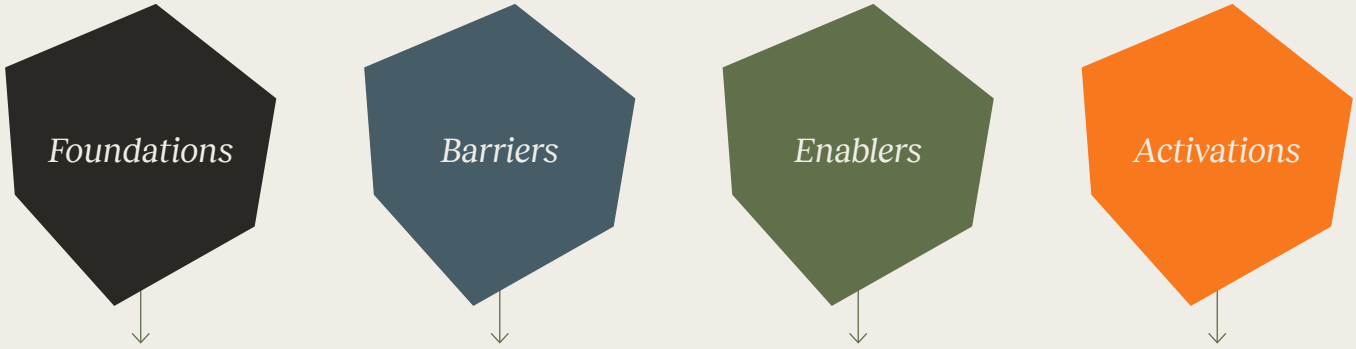
Enablers

For fortification efforts to deliver meaningful and lasting public health impacts, the right enabling factors must be in place. Key enablers that facilitate increased private sector action on fortification include fostering cross-sector collaboration, advancing and harmonizing policy and regulatory frameworks and harnessing industry leadership to drive innovation and alignment with nutrition goals.

Activations

Activating and sustaining effective fortification efforts requires bridging the gap between technical readiness, enabling frameworks and consumer engagement. Success depends on effectively engaging consumers and stakeholders through communication, capacity building and adaptation to changing food environments. By embedding fortification into public awareness and policy frameworks and continuously innovating, fortification can become a lasting and impactful solution to global nutrition challenges.

Figure 1: Summary of the playbook's four parts



- **Data-driven strategies:** Effective fortification requires identifying public health needs, understanding local dietary habits and evaluating consumer perceptions.
- **Strategic selection of vehicles:** Prioritize food vehicles that align with existing dietary habits and that populations widely and regularly consume, such as flours, cereals and cooking aids.

- **Consumer awareness and perceptions:** Many consumers are unaware or skeptical of fortification benefits.
- **Costs:** High costs associated with fortification can be a barrier for manufacturers.
- **Policy harmonization:** Inconsistent regulations across countries increase production costs and logistical challenges.
- **Enforcement:** Inadequate enforcement of fortification standards undermines their effectiveness.

- **Establishing a clear direction:** Stakeholders must agree on and define unified goals to guide consumer-focused, health-aligned fortification efforts.
- **Multi-stakeholder collaboration:** Partnerships among the private sector, NGOs and consumer groups are essential.
- **Policy and regulatory frameworks:** Harmonizing fortification policies and facilitating transparent communication about benefits are crucial.

- **Public awareness campaigns:** Educate consumers about micronutrient deficiencies and fortification, and address misconceptions.
- **Supporting lower-income groups:** Biofortification can make nutrition more accessible to rural communities.
- **Embedding fortification in brand purpose:** Brands should convey the core purpose of their fortified products.
- **Continuing capacity building throughout the value chain:** Strengthening fortification requires ongoing capacity building, adaptive programs, innovation and elevating the importance of fortification for consumers.

Introduction

Today's food systems face major challenges, including unsustainable agriculture, food waste, and unequal access to nutritious food – resulting in over $12 trillion in hidden costs.[7] Our food consumption drives one-third of global greenhouse gas emissions and three-quarters of biodiversity loss, while over 700 million people remain food insecure.[8,9,10] There is an urgent need to transform food systems to prioritize sustainability, equity, and nutrition. Food fortification plays a vital role in tackling nutrient deficiencies, particularly among vulnerable populations, by enhancing foods with essential vitamins and minerals. Transforming food systems and scaling fortification efforts are critical to improving global public health.

Hidden hunger

Micronutrient deficiency, characterized by the insufficient intake of essential vitamins and minerals, poses a significant threat to global health, affecting billions of individuals worldwide. Poor intake of these essential nutrients can lead to both acute and long-term health conditions and more subtle, suboptimal physiological and cognitive functioning, which can impact long-term well-being.[11] Studies show that climate change will lead to an increase in malnutrition (e.g. through the reduced availability and accessibility of fresh food products), with an expected 23% rise in severe stunting in sub-Saharan Africa and 62% in South Asia by the 2050s.[12,13,14]

While micronutrient deficiencies disproportionately affect individuals in low- and middle-income countries, there are clear indications that all countries have micronutrient deficiencies in their populations. According to a recent analysis in *The Lancet Global Health,* more than 4 billion people worldwide do not consume enough iron and vitamin C and the majority of the global population has inadequate micronutrient intake.[15,16]

A cost-effective and impactful lever

The World Health Organization (WHO) recognizes food fortification as a highly impactful, evidence-based and cost-effective lever to combat vitamin and mineral deficiencies and increase micronutrient intake.[17] Despite this, food fortification has yet to reach its full scale and potential. Global organizations and collaboratives like the Micronutrient Forum and the United Nations Forum on Sustainability Standards recognize the opportunity to mobilize efforts and resources focusing on fortification as an effective strategy in improving food and nutrition security around the world. In addition, in 2023 the World Health Assembly adopted a resolution to accelerate Member State action on effective food fortification.[18]

Industry leadership

Industry leadership is important in helping governments achieve food fortification objectives. Key drivers for industry often have their roots in a company's mission to contribute to better nutrition and a desire to show environmental, social and governance (ESG) leadership. Business rationales, such as enhanced market shares, unlocking new growth areas or cost-related considerations, support this.

For voluntary fortification, a possible additional driver is brand or product differentiation and addressing new or existing consumer needs. Risk mitigation is another driver of fortification efforts, for example in regions with upcoming mandatory fortification policies.[19]

Positive outcomes for industry champions can include increased ESG impact, enhanced reputation and strengthened market position or revenue growth. Successful food fortification collaborations can also lead to international recognition and, in some cases, unlock financial support to scale impact.[20] Industry champions also play a role in galvanizing interest from other parts of the sector, thereby creating momentum across value chains for larger collaboration and impact.[21]

Nutritious food for all

WBCSD's Vision 2050 imagines a future in which businesses, farmers, policymakers and civil society collaborate to deliver regenerative and equitable agricultural systems producing quality raw materials and nutritious food for all by 2050. Achieving healthier diets produced sustainably and equitably requires a combination of interventions working in parallel – there is no single solution. Some actions will deliver short-term benefits for people and the planet, while others may take years or decades to show any effects.

The WBCSD Healthy and Sustainable Diets Roadmap outlines a comprehensive range of action areas where companies can contribute to delivering healthy, sustainable and affordable diets.[22] Fortifying appropriate foods, especially for food-insecure populations, is one of the action areas identified in the roadmap for acceleration through multi-stakeholder collaboration (see Figure 2).[23]

Inspiring multi-sector collaboration and action

Scaling up fortification efforts is not straightforward. The private sector faces roadblocks in accelerating fortification efforts that stem from internal and external challenges.

This playbook identifies some of the real-world, pervasive challenges to fortification efforts and considers how to overcome them to yield sustainable business models leading to better outcomes for public health. It serves as a resource reflecting the collective insights of private sector stakeholders and experts in the fortification space. It is not an exhaustive academic review but rather a focused exploration of business perspectives on fortification-related challenges, opportunities, and areas requiring greater alignment to enhance food and nutrition security. The intent is for this to be a best-practice playbook aimed at the private sector but with relevance for policymakers, civil society actors and all those who contribute to the food system.

The goal is to inspire collaboration among actors across the value chain and create a springboard for action, resulting in effective and responsible fortification initiatives that ultimately improve food and nutrition security in low-, middle- and high-income populations alike.

The insights address the following elements:

- → **Foundations** required for successful business models for fortification and public health impact;
- → **Barriers** that limit the adoption and impact of fortification;
- → **Enablers** to promote collaborative partnerships and establish regulatory frameworks that create an effective marketplace for fortification;
- → **Activations** to drive market optimization and continued capacity building across the value chain.

Figure 2: Sub-action area: improve nutrition and environmental profile of food products, meals and offerings[24]

SDG Impact

Solutions	Prioritization for collective action	Prioritization for individual company action
Adjust product portfolios to improve the nutrition and sustainability of food products, means and offerings, while maintaining taste, accessibility and affordability for all.	H	H
Reformulate products and/or recipes to improve their nutritional content and taste, as well as their sustainability.		
Fortify appropriate foods (products, recipes ingredients, etc.) to increase micronutrients (particularly important for food insecure populations).		
Use adequate processing technologies and practices to preserve nutrients and enhance environmental sustainability across the supply chain (e.g., through adequate cooling and packaging technology, production and processing practices, transportation/ logistics and storage). Consider the role of new business models in valuing waste products.		
Improve packaging design and functionality to preserve nutrients and enhance environmental sustainability (e.g., reducing the weight of packaging and using modified atmosphere packaging, increased use of resealable packaging with improved seal integrity, etc.).		
Use sourcing standards to procure a diverse range of healthy and nutritious ingredients.		
Develop sustainable sourcing policies (e.g., zero deforestation, sustainable land-use, appropriate water stewardship) for key ingredient commodities (e.g., soy, palm) to reduce the conversion of important ecosystems (e.g., tropical forests).		

H high-level priority M medium level priority L low level priority

Part 1: *Foundations*

01.

Part 1: Foundations

Establishing foundational elements is essential for meaningful and impactful fortification efforts. The critical steps required to design and implement effective fortification models include identifying public health needs, understanding local dietary habits, evaluating consumer perceptions and ensuring affordability without compromising quality. By anchoring strategies in evidence-based data and aligning them with consumer needs and behaviors, fortification efforts can achieve meaningful public health outcomes.

Data-driven foundations for effective fortification

Effective and impactful fortification strategies find their roots in evidence-based practices and policies, driven by solid data, from the bottom up, to produce tailored solutions.

There are three key data points for effective fortification strategies.

1. Identifying the specific public health gap and issues to address

The collection and analysis of government-led national dietary survey data is crucial to understanding the prevalence of micronutrient deficiencies and the groups most in need, such as pregnant women and young children. Data reveals that micronutrient gaps vary significantly by country and by socioeconomic group, with deficiencies consistently more prevalent in lower-income groups.[25] However, the data required to make strategic decisions to address these gaps and improve outcomes for target populations is sometimes fragmented and varies in robustness. This highlights the need for more comprehensive and reliable information that enables effective decision-making by all actors.

Further modelling can both reveal household consumption patterns and assess the contribution that the fortification of specific foods and food groups can make to intakes, allowing for the selection and prioritization of those micronutrients best suited to fortification efforts. Fortification strategies can, if needed, focus on specific segments of the population that are the most in need of micronutrient interventions and where anticipated public health impacts are predictable.

2. Understanding local and sociocultural consumption patterns and purchasing behaviors

Household consumption and purchasing data provide valuable information regarding how to best target the entire population or specific population groups via appropriate vehicles. This might include chosen foods, channels, formats or the ability to recognize fortified foods for both market-driven and mandatory fortification efforts.

3. Evaluating consumer understanding

Consumers are often unaware of micronutrient deficiencies,[26,27] their prevalence and the potential health consequences. This lack of awareness can hinder the adoption of fortified products. For instance, many believe that eating a generally healthy, balanced diet eliminates the risk of deficiencies. However, data reveal that in many regions, access to the diverse foods needed for a nutrient-adequate diet is limited, and people cannot achieve the required intake of key micronutrients through food alone. Climate change further complicates this issue by affecting the availability and diversity of nutrient-rich foods like fresh fruit and vegetables.

Key factors influencing the success of fortification efforts include product quality, affordability and sensory appeal, as these determine consumer acceptance, purchase and consumption. Balancing fortification with product attributes, such as taste, texture and appearance, is essential in avoiding consumer pushback.

Strategic selection of fortification vehicles

As is well documented,[28,29] fortification strategies should prioritize food vehicles that align with existing dietary habits and that the target population widely consumes. Foods like flours, cereals, condiments, beverages and cooking aids are effective carriers, as they can consistently reach large and vulnerable groups while supporting sustainable and healthy dietary patterns.

Populations must consume the food vehicle in sufficient quantities, and the stability and bioavailability of added nutrients must be maintained during storage and household preparation. At the same time, fortification should complement overall dietary intakes without causing imbalances or exceeding safe upper limits for nutrients.

Foundations: takeaway message

Achieving food and nutrition security through fortification initiatives hinges on a collaborative, data-driven and consumer-focused approach that aligns public health goals with sustainable food systems, while ensuring fortified food products remain accessible, effective and appealing to all population groups.

Part 2: *Barriers*

02.

Part 2: Barriers

Despite its proven potential to address micronutrient deficiencies and improve public health, food fortification efforts face significant barriers that limit their adoption and impact. Addressing these challenges requires a multi-pronged approach: increasing consumer awareness and perceptions, managing the costs associated with fortification, streamlining policy and regulatory frameworks, and ensuring robust enforcement mechanisms. By identifying and overcoming these hurdles, food system actors can advance toward broader accessibility and sustained impact.

Consumer awareness and perceptions

Understanding consumer perceptions and preferences is critical to the success of fortification efforts. Evolving health challenges, food cultures and nuanced consumer demands underscore the need to better bridge fortification practices with public awareness and understanding.

Awareness of fortification varies significantly by geography, age, socioeconomic status and perceived benefits. Many consumers remain unaware or skeptical of its advantages, which lowers acceptance and demand, discouraging investment. For example, a US survey revealed that while many recognize the term "fortification", only a quarter understood its purpose or impact.[30]

Additionally, the growing preference for clean labels and recognizable ingredients presents communications challenges for companies as they seek to grow consumer understanding of the ingredients and why they are important, leading to acceptance of their products.

Cost associated with fortification

A significant internal challenge for the private sector is the cost associated with fortification.[31] Innovating or reformulating products to incorporate high-quality fortificants, along with rigorous validation and testing to ensure nutrient retention and compliance with labeling claims, all contribute to increased costs. While some fortified products are premium, many are meant for everyday consumption across socioeconomic groups, meaning products must remain affordable and accessible for the right targets. This is especially challenging when targeting lower-income families, where affordability is critical, and profit margins are already narrow.

Lack of policy harmonization

As many countries establish their own regulations and standards for fortification in alignment with local micronutrient needs, manufacturers face a complex and fragmented landscape. This lack of uniformity leads to increased production costs and logistical challenges, as companies must adapt their products and labeling to comply with varying requirements. This fragmentation hinders economies of scale, making fortification more expensive and potentially limiting the availability of fortified products, particularly in smaller markets. Furthermore, inconsistent policies can create confusion for consumers, undermine trust in fortified foods and erode equity, as labeling and claims may differ across borders.

Enforcing compliance

From an implementation perspective, inconsistent application, lack of monitoring and inadequate enforcement create significant challenges for mandatory fortification programs, particularly in low- and middle-income countries. This situation leads to an uneven playing field for manufacturers and undermines the effectiveness of fortification initiatives.[32] Evidence from African and Asian countries reveals the extent of these challenges. Comprehensive assessments of national fortification programs demonstrate that coverage and compliance remain critically low.

Population-level studies indicate that roughly half of households adequately access fortified products, while industry-reported quality control data suggests that less than half of all product samples meet established national fortification standards across various food categories, including maize flour, wheat flour, sugar and vegetable oil.[33] These statistics highlight how the lack of robust monitoring and enforcement systems can render fortification policies ineffective. Without consistent compliance checks and meaningful repercussions for non-compliance, manufacturers may not have the incentive to adhere to fortification standards. This absence of oversight creates uncertainty and undermines trust in the system, potentially discouraging investment in fortification initiatives and limiting their impact on public health.

Barriers: takeaway message

While food fortification holds significant promise in combating micronutrient deficiencies, its success depends on addressing key barriers: improving consumer awareness, reducing costs, harmonizing policies and enforcing standards. Overcoming these obstacles requires a coordinated effort among governments, the private sector and civil society to ensure fortification initiatives are accessible, impactful and sustainable.

Part 3: *Enablers*

03.

Part 3: Enablers

For fortification efforts to achieve meaningful and sustained public health impacts, the right enabling factors must be in place. The key enablers needed to facilitate increased private sector action on fortification include focusing on fostering collaboration across sectors, advancing policy and regulatory frameworks and harnessing industry leadership to drive innovation and alignment with nutrition goals. By doing so, value chains can scale and sustain efficient fortification solutions as a critical part of a global food system solution.

Establishing a clear direction

Advancing fortification in a global food system framework requires stakeholder collaboration in defining and aligning on clear, unified goals that serve as a "guiding star". These shared objectives will provide a cohesive direction for all actors involved. Companies can then leverage these overarching goals to complement their internal guidelines or policies, adopting a more consumer-centric approach to ensure alignment with public health priorities, fortification standards and consumer needs.

Advancing multi-stakeholder collaboration

Foster partnerships

Successful fortification initiatives often involve multi-stakeholder collaborations that foster beneficial partnerships among the private sector, NGOs, consumer groups and other stakeholders. These collaborations are essential from the outset to identify fortification goals, address issues in vulnerable populations and unlock possibilities. While a neutral facilitator can be helpful in guiding this process, active engagement from all parties is crucial to unlocking consumer-centric and technically feasible solutions. Early engagement also promotes the critical piloting of schemes and impact assessments, such as partnering with academic institutions to monitor success and provide credible validation.

Create trust

A collaborative approach helps ensure an inclusive process is in place between technical experts and policymakers and to expose differences in priorities and ways of working. Successful initiatives require the building of trust between actors in the value chain, supported by positive policy engagement aligning private sector commitments with their policy influence strategies. They also require transparent and consistent communication about the nutritional benefits of fortified products to gain consumer confidence and ensure the effectiveness of fortification.

Pool knowledge

The strength of public-private partnerships and multi-stakeholder collaboration lies in bringing together the unique expertise and capabilities of diverse individuals and organizations. It is essential to leverage experience and knowledge from a broad range of disciplines, including experts in the private sector, academia and healthcare professionals, such as local dietetic associations. Establishing technical working groups could address emerging challenges, review scientific evidence and provide recommendations for policy creation and adjustments. Pre-competitive industry networks in a country or region are a valuable way to address fortification issues promptly instead of waiting for policy development, which is often a slow process.

Advancing policy and regulatory frameworks

Comprehensive policies that address all aspects of fortification yield better public health impacts. Businesses play a critical role in advocating for ambitious policies, as their support provides policymakers with the certainty and confidence needed to adopt bold positions. While developing effective fortification policies requires the careful consideration of specific contexts, general principles can provide valuable guidance to support and accelerate private sector fortification efforts. It is crucial to recognize the necessity to tailor policy advocacy and implementation to the unique circumstances of different jurisdictions. Given the complexity of fortification, a nuanced approach that considers local regulatory environments, market dynamics and cultural factors is essential. The following policy principles offer a starting point for the private sector to engage constructively with policymakers, keeping in mind the need for context-specific adaptations.

Harmonize fortification rules and standards

The lack of harmonized fortification regulations between countries can significantly hinder scaling fortification. It adds complexity and ultimately results in fewer fortified products entering the market, which negatively affects food and nutrition security. Establishing mutual recognition of fortification standards between countries, especially in regions like Europe and Southeast Asia, could significantly reduce trade barriers and allow for economies of scale. This would make fortification more affordable and accessible. While complete mutual recognition is challenging, it may be possible to strive for complementary regional standards to provide common ground. Encouraging countries to align their national fortification policies with Codex standards[34] could be one avenue to create a more unified approach.

Facilitate transparent communication

Regulatory frameworks that facilitate transparent communication about the benefits of fortified products are essential to increasing consumer awareness and driving demand and purchasing intent. Legislative frameworks underpinning communications should take consumer-centric approaches, such as to labelling and claims. There is an opportunity to ensure regulations facilitate relevant consumer-friendly language to enhance understanding. However, effective consumer education goes beyond marketing, creative labeling or claims; it must focus on conveying how fortified products and their ingredients contribute to health and nutrition.

Requirements for health claims across different countries and regions often vary, which can make it difficult to create a business case for a scalable fortified product where manufacturers can universally communicate the health benefits to the consumer. Additionally, the gap between cutting-edge nutritional research and the claims that have officially received approval for use often limit the value of investing in scientific programs to study the health benefits of a food.

Achieve alignment between policymakers

In a similar vein to harmonization, there is also an opportunity to consider the broader policy landscape and avoid conflicting regulatory landscapes that present complexity in fortification. Conflicts might include other public health policies, industry standards and import taxes. Policymakers should work together to identify and reconcile conflicting regulations and create a cohesive and evidence-based approach.

Case Study

Implementing transparent communication for iodine fortification in Indonesia

In Indonesia, iodine deficiency is a long-standing problem, particularly among pregnant women.[35,36] It has, however, been challenging for companies to communicate effectively about the benefits of fortification as consumers are receiving conflicting information from different sources. For example, a report from the Indonesian Ministry of Health[37] suggests that iodine deficiency is no longer an issue for the population based on the rationale that goiter is less prevalent. Other sources, including global NGOs and local nutrition organizations, continue to highlight iodine deficiency as a significant contributor to poor health outcomes, even in the absence of goiter, based on different data.[38] Collaboration between stakeholders would promote unified positions grounded in the latest and best data and with input from academia.

Test and review fortification policies

Starting with pilot programs to test new fortification policies or methods on a small scale before expanding them allows for a more adaptable approach. This helps to identify possible issues early and ensures that policies work well before their wide application. Similarly, setting up regular review processes, perhaps every five years, would allow for updates based on changing eating habits, new scientific research and advancements in technology. This would help keep the policies relevant and effective over time.

Scale fortification efforts through investments and incentives

Policy frameworks could help lower the costs of fortification across various initiatives, with government support playing a key role in enabling progress. For example, governments could invest in the collection of credible dietary intake data to support the foundations of fortification goals and impacts across the duration of the intervention. Governments could also facilitate the lowering or elimination of import taxes on fortificants, especially in countries where there are no manufacturers that produce them locally. This would significantly reduce the cost of fortification and make it more accessible.

The investment in local capacity for fortificant production, including infrastructure and training, could enhance supply chain resilience and reduce reliance on imports. A beneficial model would be to have global and local sourcing in tandem. A successful example of such a partnership is rice fortification in Bangladesh, with the local production of fortified rice kernels. The private sector (dsm-firmenich), working with an intergovernmental organization (the World Food Program), has built capacity in-market,[39] growing access to fortified rice from 30,000 to 7 million consumers between 2013 and 2021.

Monitor and audit fortification practices

Independent laboratory facilities and regular audits of fortification schemes could strengthen monitoring and auditing efforts by creating an equal playing field and thus increasing the number of adequately fortified products. Organizations already doing this include the Micronutrient Fortification Index (MFI), Technoserve (which is actively monitoring the micronutrient fortification of flour) and TNS. Similarly, the adequate validation of health claims would help build consumer trust.

Enablers: takeaway message

Scaling fortification requires a high-ambition agenda that sets a clear direction for all stakeholders. Three key pillars should support this overarching vision: enhanced public-private collaboration to drive innovative solutions, the alignment of incentives with nutrition and sustainability outcomes, and specific policy measures that create a conducive environment for fortification.

Industry leadership plays a pivotal role in driving these efforts, as companies often see fortification as a way to advance their mission to improve global nutrition while unlocking new revenue opportunities. By fostering this collaborative, policy-driven approach, value chains can better align the efforts of all fortification actors. This strategy both promotes innovation and accountability and ensures that fortification initiatives are both sustainable and impactful in improving public health outcomes.

Case Study

Stakeholder collaboration to improve rates of malnutrition

Kenya's arid and semi-arid (ASAL) region represents 80% of the country's landmass and is home to 15 million people. Due to climate and socioeconomic factors, the ASAL region faces a malnutrition rate of 65%, which is significantly higher than the national rate of 29%. Additionally, comparisons with non-ASAL counties show that school attendance and enrollment tend to be much lower in this region.[40]

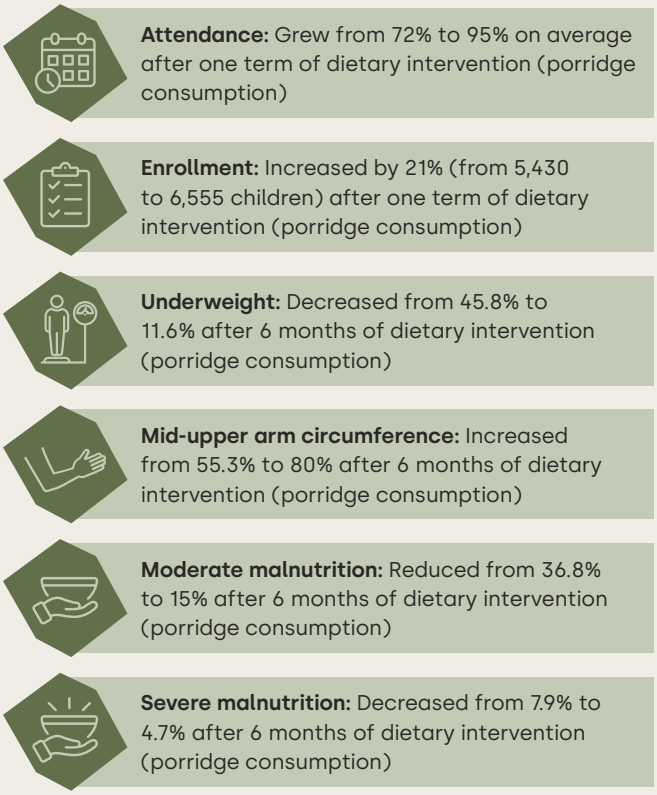
In an effort to increase school attendance and reduce malnutrition, the National Council for Nomadic Education in Kenya (NACONEK) launched a program called Porridge 4 Education. It aims to improve food security and education outcomes. Due to a lack of refrigeration and infrastructure, it was difficult to reach schools and last-mile areas. To address these challenges, key players have stepped in from the private sector to develop an aseptic, ready-to-drink, fortified Super Porridge formulated for school children.

Super Porridge is a gold standard example of how partners from different sectors and across the value chain can work together to solve a problem. Spearheaded by Tetra Pak Food for Development and in partnership with NACONEK, the collaboration included DSM to leverage its fortification capabilities, Ingredion to support with formulation and taste solutions, Tetra Pak to provide the processing and aseptic packaging expertise as well as project implementation support, and JetLak Foods to support with manufacturing. The in-kind contributions of each company for 5,000 children enabled this pilot project, with scale-up support from NACONEK.

Made from locally sourced climate-resilient crops, such as soy, maize, sorghum and sweet potatoes, and fortified with 15 essential vitamins and minerals, Super Porridge reaches approximately 50,000 children. The partners hope to expand this further in the future. Super Porridge is shelf stable for 6 months and does not require refrigeration, which ensures food safety and hygiene until the last mile.

As demonstrated by data from a pilot program launched in 2023, the introduction of Super Porridge has been wildly successful in reducing malnutrition and improving school enrolment across the ASAL region. For example, after just one term of porridge servings, attendance increased from 72% to 95% on average. Additionally, the number of underweight learners reduced from 45.8% to 11.6% after 6 months of porridge consumption. While the primary formulation of Super Porridge was intended to combat malnutrition and drive school attendance, the partners involved in its development have integrated wider positive impacts at all points of the value chain, including benefits for smallholder farmers and the creation of jobs. Super Porridge exemplifies a successful collaborative solution designed with a sustainable food system in mind.

Figure 3. Outcomes of the Porridge 4 Education program



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→ NACONEK, Porridge4Life foundation. Data gathered in 17 schools, 190 learners in Isolo central

Part 4: *Activations*

04.

Part 4: Activations

To activate and sustain impactful fortification efforts, it is critical to bridge the gap between technical readiness, enabling frameworks and consumer engagement. This requires deploying effective communication strategies to inform, inspire and build trust among consumers, while continuing to strengthen capacity across the value chain. By leveraging tailored messaging, fostering awareness and adapting to evolving food environments, stakeholders can drive the successful implementation and scaling of fortification initiatives, ensuring they meet public health goals and consumer needs.

Opportunities

Improve public awareness

Launching public awareness campaigns to educate consumers about fortification, addressing common misconceptions such as concerns about over-fortification, and highlighting the role of fortified foods in a healthy diet are crucial to empowering consumers to make informed choices and increase consumer demand and acceptance. Governments and stakeholders have a responsibility to help tell a consistent and compelling story.

Focus on benefits, not deficiencies

While raising consumer understanding about micronutrient deficiencies and the purpose of fortification is important, it is essential to consider motivating and inspiring consumers with communication on health benefits and what products can do at the individual level. Best practice would be to frame fortification as enabling a better future and improved health outcomes, rather than addressing a problem.

Support lower-income groups through biofortification

Biofortification presents a potential solution for lower-income communities that cannot afford fortified foods that may be more expensive due to processing and packaging. Increasing the nutrient density of staple crops through conventional plant breeding and improved agronomic practices can make nutrition more accessible to rural communities that primarily rely on their own harvests and cannot afford diverse diets or fortified foods.

Case Study

Educating consumers

The Food Safety and Standards Authority of India, for example, identified the need to educate consumers on the purpose of fortification and help them identify fortified products to enhance purchase intent. The inclusion of a "+F" logo on packaging has created a simple and recognizable signpost for consumers.[41]

Case Study

Addressing child growth

In Indonesia, recent data indicates that the growth of approximately 22% of children under five years of age is stunted;[42] 38.5% of them are anemic.[43] Unilever's Royco Nutrimenu inspires caregivers to prepare nutritious and budget-friendly meals with iodine-fortified products to address child stunting. From 2019 to 2023, the initiative reached 18 million mothers and resulted in about 75% of participants gaining the skills and knowledge necessary to prepare meals according to Indonesian healthy eating guidelines.[44] The program has helped reduce the number of children at risk of stunting by 37% in areas of Bogor City where it was implemented.

Case Study

Creating broader understanding of iron's importance in diets

Nestlé first piloted its Living Strong with Iron campaign in Ghana, Central West Africa, in 2019 and then rolled it out to a number of countries in the region.[45] Instead of simply promoting fortified foods, the program aims to create a broader understanding of iron's importance and how different foods, including fortified options, contribute to overall dietary iron intake. The campaign employs relatable messaging and real-life stories to connect with the audience and make it more memorable and engaging. Insights into the work also reveal specific cultural practices that might hinder iron absorption, such as consuming iron-rich foods with tea. This has led to a shift in messaging, advising people to separate their consumption. A multi-stakeholder approach ensures that the messaging is credible and aligns with public health goals, while media partnerships amplify the reach.

Embed fortification in brand purpose

Embedding fortification in the brand purpose creates a clear call-to-action for consumers by conveying the product's core objective.

Leverage trusted sources

Partnering with credible stakeholders like governments and academia and considering opportunities to communicate to consumers through healthcare professionals build trust. Sources such as professional bodies bringing together doctors, dietitians and nutritionists can provide trusted and educated advice on fortification to enhance the credibility of messages and improve brand transparency and trustability. These groups, therefore, also represent important stakeholders for the private sector to partner with.

Continuing capacity building throughout the value chain

To optimize impact, fortification efforts will benefit from continued capacity building, improved monitoring and increased awareness and engagement. There are many opportunities to bolster fortification further via multi-stakeholder collaborative efforts. Below we outline a three-point plan for capacity building.

1. Measure impact

Once fortification programs are in action, the regular measurement of population impact is critical in determining success. While health outcomes present the end-goal, other metrics, such as improvements in population micronutrient gaps, reach and exposure and changes to attitudes and behavior, will demonstrate program effectiveness. For example, the Follow in my Green Food Steps program in Nigeria, a healthy cooking campaign targeted at women and teenage daughters, aims to help increase the intake of iron.[46] The outcomes of this branded behavior change program show improved awareness of anemia and an increase in the amount of green leafy vegetables added to stews and the use of iron-fortified cubes added to soups. All actors throughout the value chain can contribute to data collection, sharing and amalgamation, so that policies remain data-driven, can be updated, and stay relevant and impactful.

Case Study

Local solutions to local needs

Nestlé's Bunyad is a fortified milk powder that targets children at risk of iron deficiencies that may compromise their mental and physical development. With a focus on Pakistan, the product's name, Bunyad, means "foundation" in Urdu. This directly conveys its core purpose – building a strong foundation for children's health – making the brand name inherent to its purpose. Using the local language ensures that it resonates with the Pakistani audience and emphasizes the brand's commitment to local needs, fostering an authentic conversation with consumers about the fortification message. Furthermore, Bunyad targets the need for affordability and highlights its positive benefits, which according to consumer insights resonates better than focusing on deficiencies associated with lower-income groups. As economies progress, emerging consumers aspire to move up the income pyramid, are ambitious and focused on a better life for their children. Consumer concept testing represents an important strategy in ensuring the optimization of tailored messaging.

Case Study

Partnering with healthcare professionals

Micronutrient deficiencies are still widely present in South Africa. To increase the awareness of the importance of a healthy diet, Unilever partnered in 2024 with national nursing association DENOSA (Democratic Nursing Organisation of South Africa) to train nurses on the consequences of micronutrient deficiencies and importance of fortification, in addition to other nutrition topics. The local Knorrox brand supports nutritious, affordable eating for all through tasty and nutritious products. This includes stock cubes and stock powders fortified with iron and soya mince, a textured vegetable protein fortified with zinc. These products can help consumers meet their daily micronutrient needs. The training event hosted 274 nurses. Unilever estimates that they will reach over 16,000 consumers, making them more aware of the importance of an adequate micronutrient intake for their health.

2. Stay abreast of changing food environments

Fortification programs often have long inception times, for example to create the right design and policy scaffolding, and remain on the market for many years to have the desired effect and maintain it. However, food systems and consumer attitudes have been changing considerably and will continue to do so. Fortification programs must ensure they stay relevant when faced with these changing tides. The evidence base and landscape established at the launch of a fortification program may change significantly over time, influenced by factors such as consumer purchasing behavior or the penetration of fortified products in markets. Businesses should stay abreast of these factors to adjust fortification programs accordingly.

Equally, as the complex picture of food and nutrition insecurity and the diversity of diets persist, the need for fortification could increase. For example, consumer diets change to meet new needs or preferences, such as vegetarianism, or to adapt habitual contexts, such as in response to an increase in the prevalence of allergies; this presents opportunities for fortification to have a positive impact. Specifically, the increase in plant-based diets and strengthening parameters of sustainability could also result in lower intakes of some micronutrients on a like-for-like basis. Fortification, for example, can close the gap in micronutrient content between dairy and plant-based dairy substitutes. Similarly, prioritizing innovation in fortification – such as transformative solutions for actionable monitoring and transparency, advanced technical tools for food producers, improved bioavailability of micronutrients, and enhanced food vehicles – could drive large-scale fortification efforts while delivering more efficient and cost-effective outcomes.

3. Elevate the importance of fortification

Continued awareness building with consumers and stakeholders will help accelerate fortification efforts; therefore, stakeholders should seize opportunities to ensure fortification is at the forefront of public health policy. Companies have done considerable work to use labels to inform consumers about the nutritional content of products. While packaging labels indicate the types of micronutrients, in some countries the first consumer signpost is, in fact, front-of-pack labelling including reference intakes and interpretive and warning schemes. To drive simplicity, these front-of-pack solutions do not feature micronutrients, thereby losing the fortification signpost. Similarly, the advent of the shift to food-based dietary guidelines also undermines the signaling of micronutrients on packaging, leading to losses in consumer awareness. Companies must ensure consumers receive the information they need to make informed decisions.

Raising awareness and understanding will take a multi-stakeholder approach, with each actor working to build relationships, share knowledge and pre-empt issues.

Activations: takeaway message

To activate and sustain impactful fortification efforts, it is critical to bridge the gap between technical readiness, enabling frameworks and consumer engagement. This requires deploying effective communication strategies to inform, inspire and build trust among consumers, while continuing to strengthen capacity across the value chain. By leveraging tailored messaging, fostering awareness and adapting to evolving food environments, stakeholders can drive the successful implementation and scaling of fortification initiatives, ensuring they meet public health goals and consumer needs.

This hinges on effectively engaging consumers and stakeholders through communication, capacity building and adaptation to changing food environments. By embedding fortification into public awareness and policy frameworks and continuously innovating, fortification can become a sustained and impactful solution to global nutrition challenges.

Conclusion

Accelerating food fortification is a pivotal strategy in the fight against malnutrition and in ensuring food and nutrition security, particularly in low- and middle-income countries where micronutrient deficiencies are the most prevalent. The private sector faces a complex landscape of internal and external challenges when it comes to fortification. Overcoming these challenges and fostering a more conducive market environment for fortified foods requires a multifaceted approach. This includes government support, enabling policies, impactful communication and the creation of sustainable business models.

Key actions to drive success

Establishing a "guiding star": Define clear, unified goals that serve as a guiding vision for all stakeholders involved in fortification efforts. This will provide a cohesive direction and ensure alignment across the sector.

Ensuring large-scale collaboration between sectors: Develop a global dataset for fortification using extensive collaboration. By pooling resources and expertise, stakeholders can create a comprehensive and actionable database to inform fortification strategies.

Inviting all stakeholders to the table: Collaborate across the value chain. Engaging governments, NGOs, academia and the private sector ensures a holistic approach to fortification.

Celebrating and championing frontrunners: Highlight successful fortification initiatives to inspire others and demonstrate the tangible benefits of these efforts.

Creating forums and hubs for innovation: Establish forums and platforms to develop, test and scale innovative technologies and partnerships. These will facilitate the exchange of ideas, best practices and collaborative solutions to fortification challenges. They will also support start-ups and small and medium-sized enterprises in the fortification space.

Increasing nutrition and fortification awareness: Educate consumers and stakeholders about the benefits of fortification to drive demand and acceptance.

Guiding positive policy engagement: Provide clear guidelines for engaging with policymakers responsibly and effectively. This ensures that fortification policies are supportive and based on evidence, and align with public health goals.

The path to success will require a holistic and collaborative approach from all actors in the food system. By working together, they can help fortification realize its full potential, ultimately improving global health and contributing to sustainable food systems.

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Disclaimer

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