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School of International and Public Affairs

Landscape Analysis of Food Fortification, and Food Quality and Safety in West and Central Africa

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A Columbia SIPA Workshop for Sustainable Development Practice report by Beryl Seiler, Josephine d'Allant, Justin DesRochers, Nora Ghobrial, and Varshini Sridhar under Scott Martin, Ph.D.

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Cover Photo

Boland, Lar. (2018). *Marie Diouf displays some of the pure salt which her team of workers are harvesting at Fatick plains in Senegal.* https://www.irishtimes.com/news/world/africa/to-the-salt-flats-of-senegal-for-a-buoyant-business-idea-1.3588141

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Acronyms

AGI: Association of Ghana Industries
APPH: L'Atelier Poissons et Produits Halieutiques [Fish and Fish Products Workshop]
APROVAG: Association des Producteurs de la Vallée du fleuve Gambie [Gambia River Valley Producers Association]
ASN: Association Sénégalaise de Normalisation [Senegalese Standards Association]
BMGF: Bill and Melinda Gates Foundation
CBC: Commercialisation of Biofortified Crops
CERFAM: Centre d'Excellence contre la Faim et la Malnutrition [Regional Centre of Excellence against Hunger and Malnutrition]
CNDN: Conseil National de Développement de la Nutrition [National Nutrition Development Council]
COSFAM: Comité Sénégalais pour la Fortification des Aliments au Sénégal [Senegalese Committee for Food Fortification in Senegal]
CWC: Child Welfare Clinics
ECOWAS: Economic Community of West African States
FAO: Food and Agriculture Organization
FDA: Food and Drug Administration
GAIN: Global Alliance for Improved Nutrition
GHS: Ghana Health Service
GSA: Ghana Standards Authority
HKI: Helen Keller International
ITA: Institut de Technologie Alimentaire [Institute of Food Technology]
MPI: Micronutrient Powder Initiative
PFS: Partners for Food Solutions
PPP: Public-private partnerships
SBCC: Social behavior change communication
SFA: Sénégal Filières Alimentaires [Senegal Food Chains]
SME: Small and medium enterprises
UEMOA: West African Economic and Monetary Union
UNICEF: United Nations Children's Fund
USAID: United States Agency for International Development
WFP: World Food Programme
WRA: Women of reproductive age

1. Executive Summary

Approximately 346 million people are suffering from hunger and malnutrition in a continent-wide food crisis in Africa, with sub-Saharan Africa in particular having the highest burden of foodborne illness per capita (ICRC 2022). Following the creation of the Agenda 2063, which issued the call to completely eliminate hunger and food insecurity on the continent, the African Union declared 2022 a “Year of Nutrition.” Within nutrition resilience, food fortification, and food quality and safety are critical components. Research shows that food fortification is one of the best, most cost-effective investments that can be made, and food quality and safety are catalysts for better health and economic outcomes. This report employs various research methods to provide a landscape mapping of potential good practices on resilience in food fortification, and food quality and safety in West and Central Africa. These findings will hopefully serve to promote dissemination of learning for more effective strategic planning, design, implementation, monitoring and evaluation.

The findings section are split into the two main themes of the report: food fortification and food quality and safety. Each section includes a description of policies, stakeholders, key projects or initiatives, opportunities, good practices, and challenges. The report highlights eight good practices actively employed by regional partners and international, research, and non-governmental organizations to implement successful nutrition initiatives, as well as a series of recommendations for how to improve food fortification, and food quality and safety in the region.

A longer version of this report is available via CERFAM.

2. Client Agency

The Regional Centre of Excellence against Hunger and Malnutrition (CERFAM) was created in 2019 through a strategic partnership between the Government of Côte d'Ivoire and the World Food Programme (WFP), to help accelerate progress toward ending hunger and malnutrition on the continent. CERFAM specializes in knowledge management, technical assistance, and South-South cooperation in support of efforts of African Governments to advance towards the Sustainable Development Goals (SDG), especially Sustainable Development Goal 2: No Hunger, which has been a challenge in West and Central Africa.

CERFAM is a catalyst for good practices and innovative solutions, especially those generated in Africa, but also serves as a facilitator of knowledge exchange between national, regional, and international actors within the development space. CERFAM serves as a platform that brings together the right people and resources so that good practices and lessons learned, as well as new knowledge, information, and data, can be transformed into concrete opportunities to advance the fight against hunger and malnutrition.

3. Context

3.1. Challenges

Approximately 346 million people are suffering from hunger and malnutrition in a continent-wide food crisis in Africa (ICRC 2022). In West and Central Africa specifically, six million children are impacted by life-threatening malnutrition, driven by land and crop degradation, periodic droughts and weather-related shocks, poverty, limited access to basic food staples and essential services, and population growth (UNICEF 2022). In addition to malnutrition challenges, improper food quality and safety measures across the supply chain can cause foodborne illnesses.

3.2. Nutrition Resilience

In its Agenda 2063, the continent's strategic framework for inclusive and sustainable development, the African Union issued a call to action to completely eliminate hunger and food insecurity on the continent. It outlines halving incidences of hunger overall, and reaching 20 percent of 2023 levels among women and youth (AU 2015, AU n.d.). The 2022 Year of Nutrition's objectives included stock-taking with respect to the state of nutrition in Africa, facilitating broad and inclusive

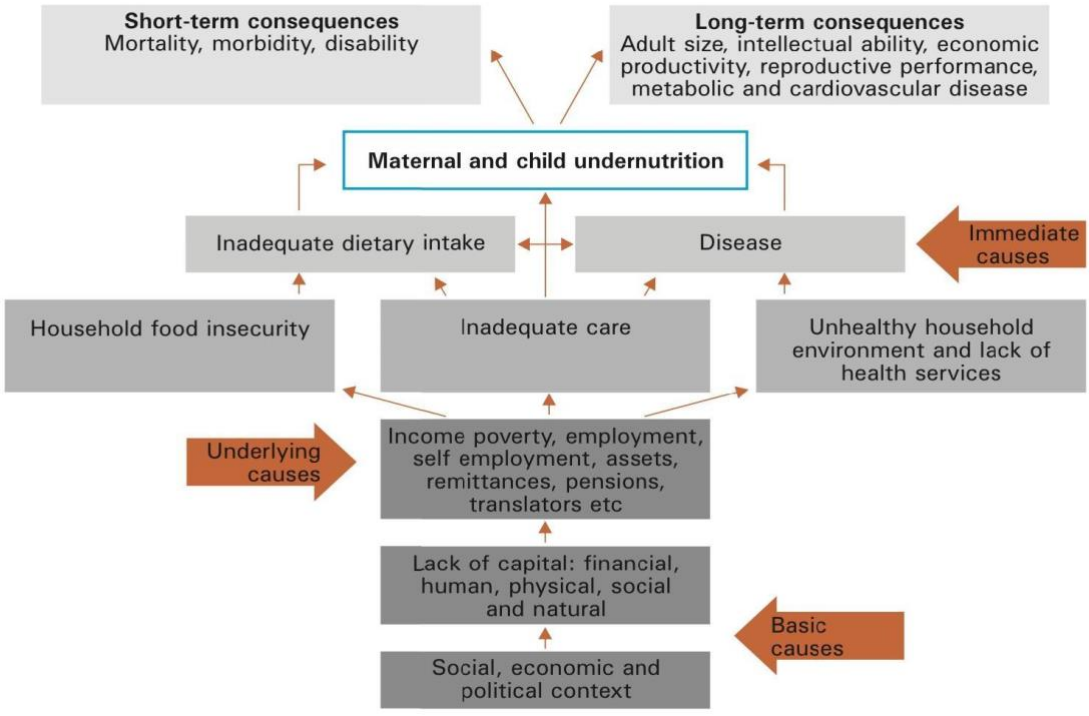
consultations and dialogues among stakeholders to ideate solutions, sharing knowledge and augment South-South cooperation, and strengthening Africa's strategic partnerships with a harmonized approach and mutual accountability.

3.3. Food Fortification, and Food Quality and Safety

Within nutrition resilience, food fortification, and food quality and safety are critical components. Research shows that food fortification is one of the best, most cost-effective investments that can be made (AU 2020). For example, every $1 USD in food fortification generally can generate a $27 USD return on investment (USAID 2022a). Additionally, food quality and safety are catalysts for better health and economic outcomes, especially for developing countries attempting to break into the international food and agriculture market (UNIDO n.d.). The objective of this study will be to explore good practices in food fortification, and food quality and safety in order to make a contribution to the wider cause of strengthening nutrition resilience.

It must be stressed that food fortification, and food quality and safety are each considerations that fit into a wider nutrition ecosystem (AU 2014). Figure 1 demonstrates the interconnectedness between the underlying causes and consequences of undernutrition, and within this the potential entry points for fortification, quality, and safety especially through dietary intake and health outcomes. It is important to remember that food fortification, and food quality and safety are not a panacea for malnutrition challenges – policies and programs centered on those themes must be implemented within a wider nutrition strategy to maximize impact.

Figure 1: Nutrition Conceptual Framework



Source: UNICEF Nutrition Conceptual Framework (2015)

Likewise, it is also essential to address the appropriate areas to implement food fortification, and food quality and safety along the value chain for nutrition (VCN). A paper from the International Food Policy Research Institute observes that interventions pertaining to the nutrition content and safety of foods are viewed as a possibility throughout the entire food chain on both the supply and demand side (IFPRI 2015). The same paper suggests that a high demand and consistent supply dynamic is the optimal point to achieve increased pro-nutrition added value by targeting processors, producers, and consumers with the food safety and fortification interventions this study will explore for good practices (IFPRI 2015). Ideally, such interventions would have a positive catalyzing impact on reducing malnutrition rates and its wider consequences. Figure 1, along with the premise that a high demand and consistent supply pattern, is the optimal point for nutrition interventions, form the conceptual framework of this paper.

3.4. Key Concepts

The following terminologies and definitions will be used throughout this report:

***Malnutrition*:** Malnutrition refers to deficiencies**,** excesses, or imbalances in a person's intake of energy and/or nutrients. It covers two broad groups of conditions (WHO 2021):

- Undernutrition, which comprises stunting (low height for age), wasting (low weight for height), underweight (low weight for age) and micronutrient deficiencies or insufficiencies (a lack of important vitamins and minerals).
- Overweight, obesity and diet-related noncommunicable diseases (such as heart disease, stroke, diabetes, and cancer).

Food Fortification refers to a process of selecting cultivated plant varieties with the aim of increasing their nutritional value (biofortification) or adding small amounts of micronutrients (vitamins, mineral nutrients, and amino acids) to staple foods in order to provide consumers with a sufficient amount of nutrients believed to improve their nutritional profile (WFP 2022a; CERFAM 2021a).

Food Quality encompasses all other attributes that influence a product's value to the consumer. This includes negative attributes such as spoilage, contamination with filth, discoloration, off-odors and positive attributes such as the origin, color, flavor, texture and processing method of the food (FAO, n.d.).

Food Safety refers to all those hazards, whether chronic or acute, that may make food injurious to the health of the consumer (FAO n.d.).

Resilience in Food and Agriculture is the ability to prevent disasters and crises, and to anticipate, absorb, accommodate, or recover from them in a timely, efficient and sustainable manner. This includes protecting, restoring, and improving food and agricultural systems under threats that impact food and nutrition security, agriculture, and/or food safety/public health (FAO 2014).

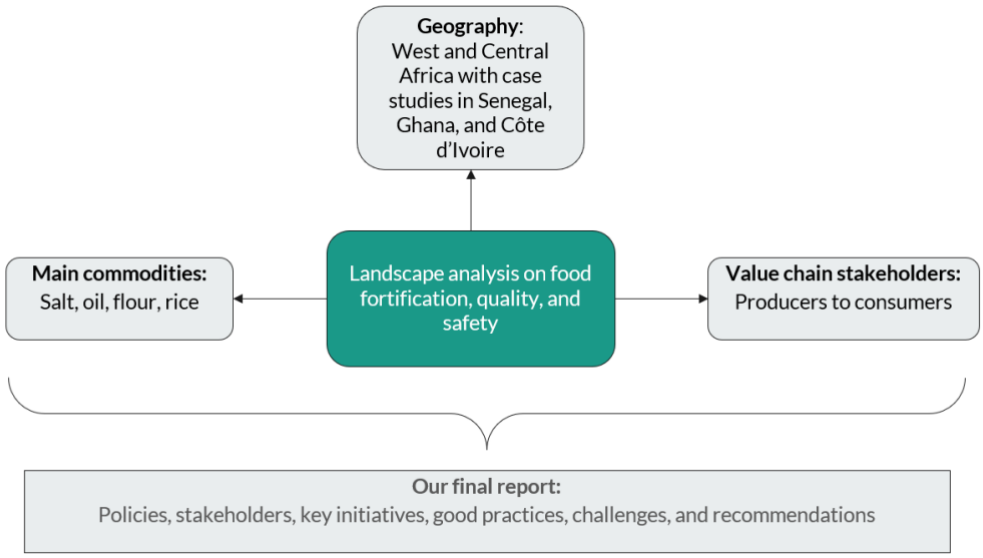
4. Objectives

This report will aim to provide a landscape mapping of potential good practices on resilience in food fortification, and food quality and safety in West and Central Africa, and relevant institutions supporting these initiatives. These findings will hopefully serve to promote dissemination of learning for more effective strategic planning, design, implementation, monitoring, and evaluation.

The objectives of this collaboration are to:

1. Undertake a landscape analysis of previous and current initiatives in building resilience in nutrition related to food fortification, and food quality and safety;
2. Collect qualitative and quantitative data through surveys and interviews with key stakeholders;
3. Identify success factors and challenges for main components of resilience in nutrition; and
4. Elaborate recommendations for the design, implementation, monitoring, and evaluation of successful resilient nutrition programs.

Figure 2: Scope of Report



5. Methodology

The research team employed a multimethod approach, including a desktop review, an online survey, and interviews and field visits, in order to triangulate data. Although the scope of the project focused on West and Central Africa, three case study countries were chosen in consultation with the client. Figure 3 highlights the broader focus of this study and case study countries considered (Senegal, Ghana, and Côte d'Ivoire).

Figure 3: Map of Region and Case Study Countries

5.1. Desktop Review

The desktop review took place throughout the duration of this study's development. A variety of academic, gray, and policy literature sources were first reviewed in December 2022 to establish the context of food fortification, and food quality and safety in West and Central Africa. One team member visited Côte d'Ivoire between January 16-21, 2023 and was provided additional sources by CERFAM and stakeholders. Subsequent field interviews and surveys with key stakeholders in March 2023 in Ghana and Senegal elicited further information to guide the continued desktop review. This later phase focused on reviewing promising sources – such as concept notes, fact sheets, progress reports, and scholarship – referenced by stakeholders, and to fill in research gaps that existed in the earlier phases of research.

5.2. Survey

A total of 30 stakeholders in West and Central Africa were contacted with the survey link. These stakeholders were initially selected based on the relevance of their work for food fortification, and food quality and safety, and their presence in the region and later narrowed down on the basis of

availability of contact information either online or through CERFAM. Out of the 30 stakeholders, nine responded.

5.3. Interviews

The key informant interview guide focused on program- or policy-specific design and implementation, collaboration, challenges, good practices, and lessons learned. One team member visited Côte d'Ivoire in January, as mentioned above, to conduct early interviews with 16 stakeholders from seven different entities regarding nutrition-related projects occurring within the country. The purpose of the visit was to provide more contextual information to inform subsequent phases of research, and the questions in these discussions focused on higher-level considerations. During the week of March 13-17, four team members split into two groups to travel to Ghana and Senegal. These countries were chosen based on the recommendations of CERFAM and local WFP Country Offices as countries that would likely arise as relevant case studies for the report. In total 17 stakeholders across 11 organizations were interviewed in Ghana, and 11 stakeholders across nine organizations were interviewed in Senegal.

5.4. Limitations

Scope of the project: Given the large geographic and thematic scope of the project, it was challenging to provide equal data and findings across West and Central Africa. To mitigate this limitation, the team focused more on the three case study countries, while taking into consideration the region as a whole. However, the team's findings may not be generalizable as the case study countries are ones that have made significant progress in these sectors.

Unequal data from different countries, topics, and types of stakeholders: During the March travel visits to Ghana and Senegal, most interviews were conducted in person in Ghana and virtually in Senegal. This resulted in differences in the available information between the two countries. Additionally, the team was at times unable to identify equal numbers of experts to speak on the different subtopics and different portions of the value chain. For this reason, the study may focus slightly more on food fortification (compared to food quality and safety) and the supply side of the value chain (compared to the consumption side).

Limited evaluation reports: There were few evaluation reports available to serve as a base of good practices and challenges of specific projects for the landscape analysis. It was difficult to find accurate documentation of projects beyond generic objectives and timelines.

Survey: The electronic survey that was originally planned to be distributed by February faced logistical issues, causing a delay until mid-March. This delay resulted in a shift in the survey's objective from informing the March field visit interviews to serving as an additional data collection tool alongside desktop review and interviews. Due to difficulties in accessing email addresses of targeted stakeholders, the sample size was limited. Additionally, the team was not able to implement a successful nudging technique, such as following up with a phone call or email to encourage stakeholder response.

6. Fortification Results and Findings

6.1. Key Practices, Interventions, and Initiatives

6.1.1. Large-scale Fortification

A variety of large-scale fortification programs and practices have been implemented across Western and Central Africa. These include efforts relating to national-level fortification, affordability and accessibility of fortified products, home fortification, harmonization of standards, premix availability, and local production of complementary fortified food.

Regional

A noteworthy regional initiative was the United States Agency for International Development **(USAID)-funded FORTIFY West Africa project** which was implemented between 2011 and 2016 in the 15 Economic Community of West African States (ECOWAS) countries. The project aimed to ratify harmonized standards for fortification and strengthen quality systems. To achieve these, the project engaged in advocating for mandatory legislations for the fortification of wheat flour and vegetable oil, training officials on monitoring and quality control and promoting the ENRICHI logo, the Regional Fortification Logo developed by the West African Economic and Monetary Union (UEMOA). In an attempt to raise awareness and facilitate identification of fortified foods, UEMOA registered the ENRICHI logo as a trademark with the African Intellectual Property Organization and developed guidelines on use and control of the ENRICHI logo. Wheat millers and oil producers in all eight UEMOA countries utilize the logo, which has also been adopted by three non-UEMOA countries.

Partnerships in promoting bio fortified crops have also developed in the region. The Commercialisation of Biofortified Crops (CBC) project and the Technologies for African Agricultural Transformation (TAAT) contributed to scaling up bio-fortification across Africa. Combining HarvestPlus' experience in bio fortification with the Global Alliance for Improved Nutrition's (GAIN) track record of working with private companies to create sustainable market models for nutritious food systems, CBC was implemented in Nigeria and other countries around the world. With a focus on commercializing Vitamin A cassava and Vitamin A maize, the project aimed to reach adolescents, farmers, workers, and women. Similarly, the African Development Bank's TAAT brought the benefit of 120 varieties of biofortified crops to more than 30 million people.

The United Nations Children's Fund (UNICEF) has been working extensively on salt iodization: their project in partnership with GAIN titled **Brighter Futures: Protecting Early Brain Development through Salt Iodization** (2008-2015) was implemented in 13 priority countries with the aim of improving iodine nutrition through salt iodization. Funded by the Bill and Melinda Gates Foundation (BMGF), the project entailed providing technical assistance to salt iodine producers, developing communications strategies to increase demand and build awareness among

producers and support the establishment of the Salt Producers Association to enable producers to access finance more easily.

Another key UNICEF project in the region is the **Project Integrated Strategies for mIcronutrient Deficiency Reduction** (INSIDER Project). The project was funded by the European Commission, implemented in Burkina Faso and Ghana, and took place from December 2019 to March 2022. As part of the project, the Food Research Institute (FRI), that is part of the Council for Scientific and Industrial Research, was responsible for looking at nutrition interventions, and conducting consultations with the EU on where to invest with a special focus on food fortification. The outcomes of the project aimed to enhance dietary and nutritional status and the economic activities of food system operators, to focus on dietary diversity and fortification in the strategies to combat micronutrient deficiencies and enhance the living conditions of local producers and small enterprises.

Ghana

Ghana too has spearheaded a few initiatives supporting the growth of fortified products, beginning with the launch of the **National Food Fortification Program** in 2007. Led by the Ghana Health Service (GHS), Food and Drug Administration (FDA), and Ghana Standard Board, the program aimed to fortify wheat flour with iron, Vitamins A/B, and folic acid, and vegetable oil with Vitamin A. Following this, several innovative interventions and initiatives were implemented through multi-sectoral collaboration. The Crop Research Institute in Ghana, for instance, received a grant from BMGF “to support efforts to evaluate and develop new high beta carotene varieties of cassava to combat the scourge of Vitamin A deficiency in rural populations” (CSIR 2022).

A more recent initiative that tested the potential of large-scale home fortification through micronutrient powders delivered via routine health services is the **Micronutrient Powder Initiative** (MPI). MPI is implemented through routine health service contacts, such as Child Welfare Clinics (CWCs) and growth monitoring and promotion sessions (GMPs), where the micronutrient powder is supplied to mothers and caregivers of children aged 6-23 months for home fortification of complementary foods. The initiative was reported to have increased appetite, reduced the frequency of illnesses, increased energy, strength and weight and facilitated early walking among children. The program provided key lessons on the value of integrating micronutrient powders with CWC services, especially in addressing anemia at such a large scale through home fortification.

6.1.2. Salt

Ghana and Senegal have had evident success in salt iodization. Both countries stand among the largest producers and exporters of salt in West and Central Africa (IGN 2022). As salt can be produced at a more decentralized level, producers are typically small-scale artisanal producers who use traditional methods.

Ghana

In Ghana, fortification efforts began with the mandatory provision for salt iodization. The successful implementation of the salt iodization program between 1996 and 2020 was due to a strong

enabling policy environment, clear standards, the creation of a National Steering Committee, and the involvement of multiple stakeholders. After a brief pause, the program is set to be revitalized under the leadership of UNICEF, USAID and Global Iodine Network. As a first step, UNICEF is working with the FDA to produce a business plan for the local artisans, assisting them in fulfilling their mandate of monitoring the salt sold in the market, supplying logistical and technical support, and generating evidence on the role of salt contained in processed foods.

Senegal

Similar to Ghana, Senegal also has large-scale programs supporting salt iodization. The stakeholder interviews revealed that there could be up to 15,000 salt producers in Senegal, mostly located in Fatick, Kaolack, Dakar, and Saint Louis. Several projects are currently underway to support the production of iodized salt especially for more artisanal producers. So far, these have focused on supporting small producers through financing and training on new techniques and quality control with the help of community workers (or *relais communautaires*). Projects such as the **Universal Salt Iodization Project** (PIUS), involving organizations like Nutrition International, UNICEF, and the National Nutrition Development Council (CNDN), focused on introducing small producers to the new tools available for fortification, norms compliance, and the relevant actors involved in the salt iodization process within the country.

UNICEF and CNDN have also been working together to ensure the supply of **iodine testing kits** at the community level. While these kits can only indicate if salt has been iodized or not, they still represent a cost-effective opportunity for quality control where resources are sparse. Senegal also features initiatives targeted at encouraging consumers to take up iodized salt. CNDN and UNICEF have also partnered on a Social Behavior Change Communication (SBCC) project aimed at creating a demand for quality products. The range of activities included the distribution of advice cards (*cartes conseils*) and informal talks at the community level (*causeries*) led by community workers and mass media campaigns through radio. The goal of these efforts is to provide information on the benefits of iodized salt as a means to tackle nutrient deficiencies.

Previous POTASSIUM IODATE test kit (S0008193)	New POTASSIUM IODATE test kit (S0003195)
	

(2019). *An image of salt testing kits*. https://www.unicef.org/supply/media/1451/file/Update-for-salt-test-kits-technical-bulletin.pdf

6.1.3. Flour

Flour is yet another commonly fortified product in the region. In Senegal, fortification of wheat flour occurs at a more centralized level, mostly in Dakar and Touba. One of the prominent wheat flour fortification projects in Senegal was the **Right Start Senegal** program led by Nutrition International from 2015-2020 (Nutrition International n.d.a). The underlying goal of the program was to improve nutrition for women and girls through iron and folic acid food fortification. By working to enhance the policy environment, strengthening enforcement mechanisms, and promoting adequately fortified wheat flour consumption, the project managed to provide five million more people with fortified wheat flour.

6.1.4. Edible Oils

Fortified oil is also a commonly used product in both Senegal and Ghana. In Ghana, oil must mandatorily be fortified with Vitamin A and was a key component of the National Food Fortification Project, along with wheat flour. The CNDN in Senegal led a fortification reinforcement program in 2010-2016 concerning the fortification of flour and oil, in partnership with the Senegalese Committee for Food Fortification in Senegal (COSFAM) and the Ministry of Commerce. While providing monitoring and evaluation support, they focused on consumer communication through radio and enlisted community workers to help consumers recognize fortified oil and flour products using images and guides.

6.2. Opportunities

Desk research and interviews with stakeholders made clear that there are several opportunities in the fortification sector within the region, including new vehicles, larger-scale fortification efforts, and community-level fortification.

Figure 4: Summary of Opportunities in Food Fortification

6.2.1. Potential for New Vehicles

Beyond the vehicles that already exist in the region, stakeholders are considering new vehicles and strategic plans that will integrate all prioritized micronutrients with the target of reducing micronutrient deficiencies. Overall, it is clear that the process for identifying new vehicles, establishing norms and guidelines, and ultimately creating legislation for mandatory fortification

requires immense effort from various stakeholders. This section highlights ongoing efforts to fortify rice, bouillon, millet, and sorghum.

Rice

Rice has garnered particular attention as a vehicle given it is a staple food for a large part of the region, particularly in households that are suffering the most from micronutrient deficiencies (CERFAM 2021a). Considering its coverage and acceptability among many consumers in the region, fortified rice in West Africa could be particularly promising (Sight and Life 2018). Although each country may have a preference of nutrients to fortify with, rice could be fortified with a variety of micronutrients, including iron, zinc, vitamin A, and multiple vitamin Bs. Several countries in the region produce a large amount of rice, but many still rely on imports of rice (Sight and Life 2018, WFP 2019a, WFP 2019b). Therefore, conversations on fortified rice are centered on whether to fortify local rice or imported rice in-country, or to import rice that is already fortified. WFP has been leading efforts in the region to support rice fortification. This includes conducting landscape and feasibility analyses, advocacy with governments, technical support, and piloting methods that fit each national context. For example, WFP sponsored a pilot in Mali to fortify rice by blending it with fortified kernels. The results show that this is technically feasible using a local mill, that the fortified rice was very similar to local non-fortified rice, and that there would be a five percent increase in costs on the producer side (WFP 2020).

Within the case study countries, both Côte d'Ivoire and Senegal are in the process of instituting rice fortification. Côte d'Ivoire is further along in the process, with WFP conducting landscape and feasibility analyses and Nutrition International conducting a cost-benefit analysis in 2020 (WFP 2019a). As a stakeholder from WFP in Côte d'Ivoire noted, rice is both imported and grown locally, and the goal is to fortify both. WFP is also working closely with the government and private sector to pilot an acceptability study, which has proven that a local mill was able to blend fortified kernels with both local and imported rice (WFP 2019a, WFP 2022b). The government is also working closely with the private sector, as evidenced by the Rice Sector Development Agency (Agence pour le Développement de la Filière Riz or ADERIZ) providing local rice and industrial machinery for fortification efforts (WFP 2022a).

In Senegal, rice fortification efforts are more nascent, although WFP conducted a landscape analysis in 2019 and is currently piloting the fortification process (WFP 2019b). According to a stakeholder interviewed from Sénégal Filières Alimentaires (SFA), Senegal currently imports around 60-70 percent of its rice, even though rice is a staple food in the country. Therefore, the focus will mostly be on fortifying imported rice. The next steps will involve working closely with the Ministry of Health and Ministry of Commerce to establish norms.

Bouillon

Another potential vehicle is bouillon, which has captured the attention of BMGF in particular. Bouillon has many options for nutrient fortification, including fortification with iodine, iron, zinc, vitamin A, folic acid, and vitamin B-12. BMGF has funded bouillon initiatives in Burkina Faso, Nigeria, and Senegal with the aim of developing evidence on the efficacy of this fortification

vehicle. In Ghana, the University of California Davis has been running clinical trials using fortified bouillon in collaboration with Helen Keller International (HKI) and BMGF (UC Davis 2020).

In Senegal, bouillon has been identified and debated as a vehicle since 2014, including within the "new opportunities" committee of COSFAM, however specific nutrients have not yet been identified. According to stakeholders interviewed at COSFAM and HKI, there are several advantages to using bouillon as a vehicle, for example that industries that could fortify bouillon are much easier to manage. In addition, bouillon is mostly used in rural areas where access to nutritious foods is difficult. Finally, there is a need to create regulations, as some industries are already claiming that they fortify bouillon. That being said, there is a large barrier to the fortification of bouillon: many stakeholders believe that its high sodium content could be linked to potential health detriments if overly consumed.

Since 2018, HKI has explored food fortification and technologies in Senegal including the level of penetration of new potential vehicles like bouillon, using a grant from the BMGF. (See Spotlight Box 1 for more information.)

SPOTLIGHT BOX 1

Initiative: Nutrition for Growth Commitment

Stakeholder: Helen Keller International (HKI)
Partners involved: COSFAM, CNDN
Timeframe: 2018 - present

Goals: Generate evidence on stakeholder perceptions on bouillon, its total salt intake, and the effect of consumption of fortified bouillon on health. Reinforce committees on new vehicles focusing on research and future policy decisions.

Explanation of Activities:

HKI has led several studies to assess the feasibility of fortifying bouillon cube in Senegal:

- Survey to better understand the knowledge, attitudes, and perceptions of different stakeholders within the country.
- Study on the level of consumption and penetration of bouillon. This helped underscore the benefit of using fortified bouillon, given the poorest communities often do not have much access to other types of food products.
- Study on the potential connection between bouillon consumption (and therefore salt consumption) and diseases such as hypertension and other cardiovascular issues.
- Nationally representative study to measure sodium intake at the household and community level. This will help inform whether bouillon fortification and subsequent marketing for consumption would lead to excess salt consumption.

All of this information is then shared with relevant stakeholders such as COSFAM, to inform decision making on the potential for bouillon as a vehicle.

Related challenges:

- Lack of evidence: The lack of evidence and monitoring data to understand the potential for and impact of fortification is a problem for fortification overall. This is why HKI conducted studies to help inform stakeholders on the potential of bouillon as a vehicle.

Related good practices:

- Focus on future vehicles: This project highlights the importance of dedicated programs and funding for identifying new vehicles to tackle nutrient deficiencies in the region.
- Decision-making based on evidence: HKI conducted several studies to address the concerns of stakeholders surrounding bouillon. The goal is not to persuade stakeholders in one way or another, but to make informed decisions based on results.
- Synergy with fortification committees: The studies conducted by HKI will help inform members of COSFAM. Therefore, it is supporting the platform's goal of knowledge sharing and equal access to information.

Engle-Stone, Reina. (2020). *An image of bouillon.* https://research.ucdavis.edu/ghana-clinical-trial/

6.2.2. Large-scale Fortification Opportunities

Desk research highlighted the opportunity to generate evidence and integrate fortification data into health management information systems (Sight and Life 2018). A fairly new project led by USAID could prove an opportunity to enhance and scale realistic tools for surveillance, training, monitoring and evaluation and accountability for national and regional fortification programs, gaps that were frequently identified in discussions with stakeholders and in literature. The USAID Advancing Food Fortification to Reinforce Diets (AFFORD) project will work with a variety of actors to build more sustainable large-scale food fortification programs (Nutrition International n.d.b). There will also be strong synergy with other key players in the sector, including TechnoServe and the Food Fortification Initiative.

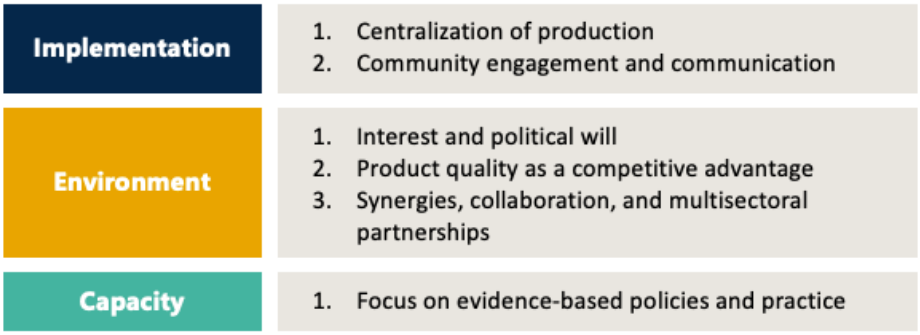
6.2.3. Community-level Fortification Opportunities

Recently, there has also been a renewed focus on fortification at the community level, especially in countries with populations that cannot easily access fortified foods. For example, in Senegal UNICEF distributes premix for household fortification. However, there are still concerns about the feasibility and sustainability regarding premix supply and quality control (Mildon et al. 2015).

6.3. Good Practices

Stakeholders interviewed underscored the importance of choosing the right vehicle to facilitate fortification. When the chosen vehicle is produced in a significant quantity, and is widely and regularly consumed, food fortification interventions can deliver essential vitamins and minerals to targeted populations (USAID 2022b). The process for choosing the right vehicle is as follows: define the target population and micronutrient deficiency in the population, select the appropriate vehicle and fortification compound, determine the necessary level of fortification and regulatory parameters, estimate the costs and technical support required, and develop a monitoring and evaluation plan (Sight and Life 2018).

Figure 5: Summary of Food Fortification Good Practices



6.3.1. Implementation

Centralization of Production

Centralizing production of fortified foods maximizes production, quality-control, and efficiency. Increased rates of urbanization, centralization of industrial processing of major vehicles, and penetration of centrally-processed foods into rural markets indicate that large-scale food fortification is poised to rise over time (USAID 2022a). At a regional level, centralized and large-scale wheat flour and vegetable oil industries have been prioritized for their smoother performance and quality monitoring, and easier ability to be scaled (Sight and Life 2018).

Stakeholders in Senegal shared that the centralization of salt producers through cooperatives improved productivity and quality. Senegal has a smaller, more centralized, and more established number of producers of fortified oil and flour products. Producers therefore feature stronger internal quality control mechanisms, and are more reachable for the Ministry of Commerce's external quality control checks. This makes it simpler to ensure that fortified oil and flour products are adequately meeting standards and norms. According to respondents from Nutrition International, HKI, and UNICEF, one of the main solutions to the issue of decentralization of salt producers is supporting the creation of federations and cooperatives to ensure producers are more aware of norms, and more likely to improve productivity and product quality. In conjunction, UNICEF has supported the creation of an iodine plant as a more long-term solution to support small-scale producers, so that they can more easily buy iodide, rather than relying on premix often distributed by funded international projects.

Community Engagement and Communication

Elevating awareness of the need and importance for food fortification is crucial (Abdoulaye and Manus 2018). Stakeholders in Senegal and Ghana stressed the need to create awareness among consumers regarding the health benefits of fortified products, and encourage their adoption in regular household diets, through robust communication and outreach efforts. Given behavior change takes time, interviewees from CNDN and UNICEF in Senegal posited that communication should be an ongoing process with community members incorporated into communication campaigns' design to improve reach and success. Stakeholders from the FDA in Ghana noted

that education and sensitization are critical to the success of programs and policies – these allow consumers who do not usually read online guidelines to have a better understanding of guidelines and standards. While stakeholders in Senegal stated that SBCC could be difficult and challenging, they added that when actors are successfully encouraged to adopt or consume fortified products, they become incentivized to continue to do so.

In Ghana, conversations with OBAASIMA highlighted the impact of social marketing campaigns. Sight and Life was responsible for conducting formative research with women of reproductive age (WRA), and developing and implementing social marketing campaigns to increase the demand for OBAASIMA products. Results showed that these campaigns had a significant impact on improving the visibility of OBAASIMA products in the market (see Spotlight Box 2 for more information)

SPOTLIGHT BOX 2
Initiative: OBAASIMA

Stakeholder: Association of Ghana Industries (AGI)
Partners involved: Sight and Life, DSM, UNICEF, German Federal Ministry for Economic Cooperation and Development, Children's Investment Fund Foundation, BMGF, Ghana Standards Authority (GSA)

Timeframe: 2013 - present

Goals: To tackle micronutrient deficiencies among women of reproductive age (WRA) and pregnant women by developing and providing access to affordable and nutritious food products fortified with 18 vitamins and minerals, in the Ghanaian market.

Explanation of Activities: Companies that wish to operate under the OBAASIMA brand need to adhere to the set nutritional and fortification requirements.

- AGI works closely with the FDA to implement the OBAASIMA seal, to assist companies in registering and certifying their products, and vetting and approving marketing elements. They also recruit and encourage SMEs to use the OBAASIMA seal on their packaging.
- GSA defines the standards and code of practice for the OBAASIMA seal.
- The first project component is looking at the food items to be fortified, product nutritional content, and the standards for product formulation. The second component is marketing to provide product visibility in the market.

Related challenges:

- Lack of a legal mandate for OBAASIMA products
- Limited funding opportunities vs. increased costs associated with incorporating the micronutrients and high selling price to consumers

Related good practices:

- Maintaining a balance between ensuring profitability for the producer and affordability and accessibility for the consumer
    - Provides producers the opportunity to operate under an established brand, lending their products both credibility and visibility in the market.
    - Allows companies to make additional sales while making a gross profit of 40 percent of the retail price and paying for the premix at 4 percent of the retail price
    - Offers a wider choice of fortified products to consumers
- Nutritional quality and adequate fortification guaranteed under the OBAASIMA seal
- Strong multi-sectoral partnership and well-defined roles for each stakeholder
- Clear specification of standards and codes of practice from GSA
- Awareness creation through social marketing campaigns

An image of food products with the OBAASIMA logo. Source: the authors.

6.3.2. Environment

Interest and Political Will

Regional and national leadership has contributed to significant progress in food fortification across West Africa over the past 15 years (Sight and Life n.d.). The political will and support of regional bodies and industry associations have provided impetus for fortification efforts, while national-level ministries have mandated fortification, coordinated, funded, and monitored fortification programs (Sight and Life 2018). The research team's conversations with stakeholders in Ghana and Senegal found that legislation, standards, and dedicated food fortification budgetary lines for better enforcement were critical enabling factors. While fortification can be mandatory or voluntary, large-scale food fortification is most effective when governments make fortification mandatory (USAID 2022b). Similarly, respondents to the team's survey noted strong enforcement and accountability measures as one of the most important success factors for fortification initiatives.

Interviewees suggested that mandatory fortification offers the benefit of food processors being more assured that competitors are more likely to comply with a standardized set of standards and regulations, and equally bearing the associated costs of fortification (USAID 2022b). In Senegal, interviewees from the Institute of Food Technology (ITA) and HKI indicated the importance of fortification being mandatory. The fortification decrees initiated by Senegal's government push industries to respect norms and improve the quality of fortified products, while government monitoring can also improve systematic respect of norms. Consumers thus experience increased access to quality fortified products.

Harmonizing regulations and standards across the region is also critical. In view of this, GAIN has worked to harmonize the standards for salt iodization across UEMOA and ECOWAS member states (GAIN 2023). By working with regional health and economic community structures, neighboring countries can promote regional harmonization and mutual recognition of standards, regulatory control procedures, legislation, and policies (USAID 2022a). Harmonization is equally necessary to ensure fortification regulations do not become Technical Barrier to Trade (TBT) (Traore 2008). Harmonized fortification policies, regulations, and regulations can contribute to

intra-regional trade by creating a level playing-field for firms and boosting demand for fortified products (GAIN 2021).

Product Quality as a Competitive Advantage

To incentivize private sector actors to engage in food fortification initiatives, it is essential to position food fortification as a competitive advantage for firms. The primary objective is to make fortified products more prominent for consumers to choose in the market. All stakeholders in Ghana pointed to the importance of convincing consumers to consciously make the choice of nutritious, fortified products over other food items, by presenting products that can be trusted for their quality. Interviewees from AGI and Premium Foods observed that the OBAASIMA seal was an indication to consumers of a product with guaranteed nutritional quality and adequate fortification, through a required set of nutrients included in order to display the seal.

GSA, who was responsible for coming up with the standards and code of practice that lends validity to the OBAASIMA seal, played a key role in guaranteeing quality and visibility to the brand. Based on whether the companies adhere to the nutrient profile criteria, GSA grants approval for their products to adopt the OBAASIMA front-of-pack-seal. Clear guidelines from GSA have helped in making fortified products more easily identifiable. AGI in Ghana further noted that the seal made products more easily recognizable to average consumers looking to make healthy food choices, allowing companies to distinguish themselves with products associated with good quality standards.

Synergies, Collaboration, and Multisectoral Partnerships

The multisectoral nature of food fortification requires public, private, and civil society engagement (Mkambula et al 2020). Respondents to the team's survey noted that cross-sectoral partnerships were the most important success factor for fortification programs. UEMOA and ECOWAS have stressed the importance of delineating the roles and responsibilities of different agencies involved in quality control, inspection, compliance and control (Abdoulaye and Manus 2018). These include food safety, customs, standard-setting bodies, food and drug control, and the industry itself. Since there is no one authority managing food systems overall, defining each agency's scope of work is particularly important.

Interviewees in Senegal emphasized involving key stakeholders and partners from the beginning of the fortification planning process. Including the private sector and industries in working groups within COSFAM has facilitated the appropriation of new measures, given they were shown that the benefits of fortification can outweigh the extra costs associated with the process. Platforms such as COSFAM and the Scaling Up Nutrition Movement in Senegal have allowed for improved implementation and monitoring at a national level across different types of actors with similar types of programming by defining the roles and responsibilities of each stakeholder. This helps avoid duplication and gaps.

Likewise, the GHS in Ghana shared that bringing relevant stakeholders together was a clear success factor in the salt iodization program, and interviewees from Premium Foods underscored the potential of public-private partnerships (PPP). In the case of OBAASIMA, stakeholders

observed that roles were well-defined and avoided overlapping with one another right from the project's inception.

Interviewees in Ghana also stated that the relationship between partner organizations and government agencies was crucial. An interviewee from AGI mentioned that one of the key aspects of its collaborative work is its ability to be a proactive voice with strong representation in government meetings and boards. Most relevant government boards in Ghana have an AGI representative, and the government frequently solicits input from AGI as an industry representative and accepts their insights on food, agriculture, trade, and other sectors. AGI has been particularly successful in leveraging trust-based relationships when working on projects such as OBAASIMA. Stakeholders cited that good practices for engaging with private sector actors include early engagement, positioning food fortification as a global best practice, working with existing industry organizations, listening to industry needs, elevating fortification to the CEO level, and building platforms to celebrate contributions.

Food fortification coordination also relies on the essential role of civil society (USAID 2022b). Civil society can hold industry and governments accountable by monitoring quality and compliance with fortification programs, and fortification fraud (GAIN 2018).

6.3.3. Capacity

Focus on Evidence-based Policies and Practices

Fortification is an evolving, dynamic process that requires continuous reassessment of performance, priorities, and impact through sustained evidence production (Sight and Life 2018). In Senegal, stakeholders stressed the importance of basing policies and practices on evidence, to convince donors to continue funding initiatives and to share the benefit of policies. In Ghana, interviewees stated that focusing on programs and practices that already have an evidence-base could shed light on the impact, success factors, and challenges in food fortification. For instance, Nutrient Profile models, which are more commonly implemented in high income countries, were found to be applicable to Ghana and particularly effective in addressing all forms of micronutrient deficiencies and malnutrition.

Nutrient Profiling has been observed to be helpful in identifying products that may be fortified, stipulating guidance for product formulation and reformulation, providing direction for marketing to consumers, regulating the availability of particular foods in public institutions such as hospitals and schools, and categorizing of foods for taxation (or subsidy) purposes based on nutrient content (Sight and Life 2018). However, as these models were designed to manage obesity in high income countries, they had to be reconceptualized and adapted to Ghana's context. Sight and Life initiated nutrient profile modeling using fortified OBAASIMA products as reference products (Sight and Life 2018).

Generating evidence can also help identify gaps and opportunities by guiding discussion and facilitating programming. In West Africa broadly, data on the prevalence of micronutrient deficiency and food consumption helped in selecting food fortification vehicles, micronutrients, and

fortification levels (Sight and Life 2018). Industry and regulatory body capacity assessments spotted equipment and human resource gaps, and regulatory monitoring has been useful for quality and performance measurement (Sight and Life 2018). Coverage surveying has assisted in deciding fortification vehicles and micronutrients (Sight and Life 2018). In Senegal, many organizations are focused on finding evidence to help support decision-making on new vehicles or new programming.

Several fortification data tools, initiatives, or platforms have or are being developed by GAIN. Fortification Management Information System (FortifyMIS) is used globally by government monitoring agencies and producers for quality assurance and quality control, while FortiMApp is being utilized for data collection at market level (Food Fortification Initiative n.d.a, GAIN n.d.a). GAIN is also currently implementing a Digital Quality Assurance/Quality Control (QA/QC) System for food fortification – building a multistakeholder data platform to exchange fortification data within factories and markets (GAIN n.d.b). GAIN is also collaborating with Food Fortification Initiative (FFI) and Kansas State University to develop an online flour and rice fortification monitoring training for global multistakeholder use (Food Fortification Initiative, n.d.b).

Studies indicate that food fortification evidence must rely on local context and data, especially on nutritional needs, usual intake of fortification vehicles, population coverage, and fortification's potential impacts (USAID 2022b). Continual testing, adapting, and scaling-up of evidence-based interventions is required to accelerate fortification's existing utility as a cost-effective, and low cost and high benefit, instrument (USAID 2022b).

6.4. Challenges

Developing countries in the region face common challenges relating to food fortification. Fortified food is often more expensive and inaccessible compared to non-fortified food, stemming from the absence of low-cost technologies and of a centralized network of food processing units. On the technical front, countries grapple with maintaining the required standard of quality control, regular monitoring, and choosing the most appropriate vehicle and micronutrients to incorporate. These challenges coupled with the lack of mandatory provisions and poor advocacy and sensitization efforts make fortified food less appealing for both producers and consumers (Chadare et al. 2019).

Countries in Western and Central Africa have made important strides in fortification, but evidence from stakeholder interviews, survey responses, and desk review suggests that progress in reducing nutrient deficiency continues to be hindered.

Figure 6: Summary of Food Fortification Challenges

6.4.1. Implementation

Lack of Advocacy, Awareness, and Take-up

One of the most widely cited challenges was poor knowledge and misconception about the benefits of fortified foods among consumers. In Ghana, this was observed to be a major barrier to the salt iodization program, as highlighted by stakeholders from GHS. Underlying this sense of skepticism about the fortificants and their nutritional value is the inadequacy of sensitization and awareness-raising programs for consumers. Stakeholders from Premium Foods Limited Ghana mentioned the challenges in sales that stemmed from the tricky process of getting the message across to the consumers in an effective manner as they often did not give much attention or importance to nutrition. Similarly, stakeholders in Senegal underscored the importance of SBCC. As consumer communication regarding fortified products is often not ongoing, consumers can forget about their health benefits and consequently show little interest in paying extra for fortified products.

For future vehicles such as rice, there are also difficulties with consumer take-up. For example, there are concerns regarding excess intake of nutrients due to fortification, and suggestions that fortified rice does not last as long as regular rice (Sight and Life 2018, WFP 2019a).

6.4.2. Environment

Nutrition and Food Security Overlap

While nutrition and food security are supposed to be viewed as complementary sectors, this is often not the case in some countries. In Senegal, the Canadian Mission stated that an overall problem was the divide between the nutrition and food security sectors. In other countries, the topic of fortification is often missing from the broader food systems approach and is less integrated

with other related sectors. CERFAM's high level food fortification consultation highlighted this as a key challenge (CERFAM 2021b).

Lack of Legislation and Political Will

Although there has been improved political interest and involvement in fortification, it has not always been a priority for governments in the region. In Senegal, this is further compounded by administration turnover and changes in dedicated budgetary lines for nutrition-related projects. The stakeholder from CNDN noted that a priority for this year was to revise the decree on salt iodization, which doesn't allow for companies to buy unfortified salt to then iodize it later. While the current decree has provisions on testing for iodization, there are no widespread methods to quantitatively measure this. Revising the decree, however, will also require a lot of advocacy and involvement from other ministries such as the Ministry of Commerce.

Another gap in the policy space is the lack of ownership of the policy. Even if policy documents are well-crafted, there is low buy-in and no one stakeholder to lead and carry the policy forward. In some cases, limited political will is reflected in the limited products the government picks for fortification, as observed in Côte d'Ivoire and Ghana. In Ghana, the current legislation covers only specific products for fortification, and associations like AGI have started pushing for legal backing for other products such as those with the OBAASIMA seal. Allowing OBAASIMA products to have the same legal backing as fortified oil, salt, and wheat flour products will help address some of the broader challenges associated with fortification.

For the acceptance of new vehicles, politics can also serve as a barrier, particularly in the case of rice self-sufficiency policies. It is clear that imports often outweigh domestic rice production, and therefore it would make sense for many countries to fortify imported rice. However, this focus on imported rice production comes up against national rice self-sufficiency policies, like in Senegal (Sight and Life 2018, Food Fortification Initiative 2016).

Fragmented Nature of the Sector

Fragmentation creates problems for the quality and quantity of fortified products. This is particularly true in the case of salt iodization, where fragmentation has hindered investments in salt infrastructure. In Ghana, for instance, approximately 60 percent of salt output is produced using modern procedures and the remaining is processed through artisanal methods. Often, small-scale producers struggle to access funding and technology and to obtain documentation covering salt fields. Stakeholders in Senegal also highlighted a decentralized system of salt production, which made training in fortification methods and behavior change difficult.

Cost of Fortificants and Fortified Products

A significant challenge associated with fortification is the cost of adding micronutrients, as this

causes the selling price of fortified products to be much higher. This has a negative impact on both producers and consumers. For producers, there is little incentive to produce fortified products, particularly in the absence of funding and with the additional cost of conforming to standards. For instance, the stakeholder from CNDN in Senegal noted that the price of iodine doubled, making salt production less profitable. In Senegal, the coverage of industrially produced fortified wheat flour is reported to be only 51 percent relative to 82 percent for its non-fortified counterpart; stakeholders suggested that fortified flour is still used fairly regularly within the population (Global Fortification Data Exchange 2023). For oil, the coverage rate for industrially produced and fortified oil is 34 percent compared to 95 percent for its non-fortified counterpart (Global Fortification Data Exchange 2023).

For poor and rural consumers, there is limited economic access to fortified products (WFP 2020). There is also the related issue of a lack of penetration of fortified products in rural areas. Fortified products that are produced in Dakar, for example, may not reach more rural zones, limiting communities' physical access to products. Stakeholders from Senegal pointed out that in certain cases, because of demand and higher prices of fortified products, smaller producers may choose to sell fortified products rather than consuming them themselves. They also highlighted the need for the government to subsidize these products to make them more affordable.

Inefficiencies in Stakeholder Collaborations

Multi-sectoral collaborations have been the driving success factor of fortification programs in the region. However, a few limitations also persist including the overlap in roles and responsibilities stemming from the lack of funding and capacity. For instance, GSA tests and sets standards when funding becomes available, although the former is not within their mandate. The effectiveness of collaboration is also dependent on proper coordination and consistent meetings. However, stakeholders often did not adhere to this. For example, stakeholders within COSFAM in Senegal meet based on specific needs rather than for a set number of times per year, especially since mandatory fortification has been implemented. Interaction happens mostly via email and not always in-person. Relatedly, coordinating meetings is particularly difficult when a diversity of stakeholders are involved. It becomes increasingly challenging to coordinate communication between the platforms within COSFAM and implement strategies in the long-term as representatives can shift to different roles in a different country.

Differences in Standards and Norms across Borders

As shown in previous sections, policies for fortification of products are not consistent across countries in the West and Central Africa region. Several stakeholders in Senegal noted that products from bordering countries like Mauritania, Gambia, and Guinea are not always fortified, which can lead to issues of quality control.

6.4.3. Capacity

Lack of Technical and Financial Support

Across the region, funding structures for fortification lack sustainability. For instance in Ghana, GAIN exited the salt iodization project without any sustainability plan or transfer of responsibilities. As GAIN was also responsible for training on salt production and equipment and delivering the fortificants to the salt producers, their exit impacted the continuity of the project. Stakeholders from GHS highlighted that if GAIN had communicated a clear exit plan, the government could have gradually taken up a greater share of the funding.

Funding in Ghana is observed to be inadequate, particularly for sectors like salt that are made of many small-scale producers. Stakeholders from the FDA pointed out that only large companies can afford to rely on fortified products. One way in which large companies are incentivized to produce fortified products is by highlighting it as a potential corporate social responsibility (CSR) activity that is solving malnutrition, as in the case of Obaasima. The fortification space will become increasingly skewed towards large-scale producers if funding and other barriers to entry are not addressed.

In Senegal, as of 2016, 88 percent of financing for nutrition came from external sources with 12 percent coming from the government (Offosse 2018). Investment for nutrition and fortification faces strong competition with other government priorities (Deussom et al. 2018). Therefore, allocations of budgets are dependent on political will. As a stakeholder from ITA put it, there is a need for more consistent support that is not sporadic and dictated by the economy.

A connected issue is the lack of technical support and resources available to ensure product fortification, especially for smaller artisanal producers. Nutrition International highlighted the lack of technical agents in certain regions like Mbour in Senegal. Smaller industrial companies also need support to improve their capacities, adapt their equipment, and improve logistics so that their products can reach consumers. This is also a barrier for new fortification vehicles such as rice. Rice fortification is more technically complicated than other vehicles, and domestic milling capacity is not up to the standards needed to adequately fortify, due to the lack of access to technologies and investment (Sight and Life 2018, WFP 2019a). In addition, a stakeholder at HKI in Senegal noted that centralizing producers would be challenging, given that 87 percent of local rice comes from small-scale mills (WFP 2019b).

Lack of Human Resources

Several stakeholders in Senegal noted the lack of staff working specifically on fortification within the government, agencies, and collaborative platforms. This may be because of a lack of financial resources leading to a lack of technical capacity and evidence generation.

Limited Availability of Data and Lack of M&E

Data is important for several reasons, including to generate evidence to inform current and future policy and programming. There is a need for both assessing impact at endline, but also for monitoring throughout the project so that stakeholders can adjust based on challenges and needs.

This is especially pertinent for new vehicles such as rice, because without data, there is hesitancy to fortify rice (WFP 2020). Many stakeholders in Senegal did say that data was available. For example, a stakeholder from CNDN noted that they received data based on certain indicators every trimester. However, almost every stakeholder interviewed noted several limitations with the current data system. Organizations lacked dedicated staff and funding to update data frequently. There was also little consistency in terms of what was available for each indicator, because data is often collected based on what is needed at the time. A stakeholder from the Canadian Mission in Senegal also observed the absence of data collection at the local and community levels.

Apart from gaps in the data system, stakeholders from Senegal also collectively pointed to the lack of data on specific topics in the fortification space. Even on the effectiveness of fortified products in reducing micronutrient deficiencies, there is space to enquire more, something that ITA and COSFAM have already started working on (WFP 2019b). As CNDN in Senegal pointed out, the last time a study was conducted on nutrient deficiencies was in 2014, nearly ten years ago. Inadequate information on the impact of fortification projects and the quality of strategies has left stakeholders with unanswered questions on whether products are correctly fortified, and if fortified products' nutritional value changed after transformation.

7. Food Quality and Safety Results and Findings

7.1. Key Practices, Interventions, and Initiatives

7.1.1. Regional

The Food and Agriculture Organization's (FAO) Food Safety Division mainly works on food safety through strengthening national control systems. This is realized through four different dimensions: the regulatory framework, stakeholder interaction, scientific capacity, and control functions. In addition to its work on the national control systems, FAO supports 15 countries in Africa to participate in the activities of Codex Alimentarius, develop their own food standards, and implement projects that are linked to trade. FAO's approach and general recommendation is for countries to adopt the International Standards of Codex Alimentarius, so that they can easily access the international markets. FAO recently conducted a survey in Codex Member Countries, that showed outstanding issues such as antimicrobial resistance, misuse of pesticide in farms, and biotechnology products.

Furthermore, GSA in Ghana collaborated with the United Nations Industrial Development Organization (UNIDO), Ministry of Trade and Industry, and State Secretariat for Economic Affairs (SECO) on a **Global Quality and Standards Programme**, which aims to address quality- and standards-related challenges, and strengthen the capacity and sustainability of the quality infrastructure in the country. Through this, the small and medium enterprises (SMEs) will be assisted in meeting the market requirements along the cashew and oil pam supply chain. The project was unique in its approach as it targeted both SMEs and quality infrastructure and

institutions to improve quality and standards compliance capacity. GSA also sensitized producers by printing copies of the standards and distributing them.

7.1.2. Smaller-scale Farmer and Fishery Projects

Within the ITA in Senegal, the **Fish and Fish Products Workshop** (*L'Atelier Poissons et Produits Halieutiques* or APPH) leads several initiatives. The workshop contributes to the development of quality standards for fishery products and works closely with the laboratory on mycotoxins, which determines the histamine content of fish products to check their compliance with quality requirements from importing countries (ITA 2021). Furthermore, the APPH helps design and construct fish processing units that meet standards, promotes good hygiene practices, and improves conservation and transformation techniques. It also supports improved technology for fresh fish transportation, including insulated containers and cold storage.

In addition, FAO focuses on fish processing techniques at the small-scale producer level, including a technique that originated in Senegal called the **FTT-Thiaroye** (FAO 2015). The technique uses smoking tools that lead to less toxicity in products coming from coal and wood. FAO training around this practice also supports better preparation of smoked products through improved cleaning, drying, and transformation practices to ensure the best quality. This includes training on what to wear during the process and important hygiene measures.

FAO. (2020). *FTT-Thiaroye in practice.* https://teca.apps.fao.org/teca/pt/technologies/8305

Within FAO, there are several intensive training projects underway to help small-scale and rural farmers to transform their products. An example is provided in Spotlight Box 3.

SPOTLIGHT BOX 3

Initiative: Rural Women's Livelihood Strengthening Project for Sustainable Economic Development in the Tambacounda Region (GAFSP project) (Sarr and Diouf 2023).

Stakeholder: FAO

Partners involved: Senegalese Association for the Promotion of Grassroots Development (Association sénégalaise pour la promotion du développement à la base or ASPRODEB); Gambia River Valley Producers Association (Association des Producteurs de la Vallée du fleuve Gambie or APROVAG)

Timeframe: 2021 - Present

Goals: Expected outcome of training target members from APROVAG on banana and fonio transformation, both of which are "innovative" products in the Senegalese market.

Explanation of Activities:

FAO provides training on the transformation process, including proper hygiene measures, improved techniques, and materials for better quality.

- For hygiene, producers are trained on the 5M rule, which includes hygiene at all levels: raw materials, manufacturing equipment, environment, workforce, and method. This includes hygiene throughout the supply chain, from the quality of raw food products, to correct storage to avoid infestation, to methods to control humidity and temperature levels. The main takeaway for producers is that good hygiene will ensure producers' reputation and survival in a competitive market, while also protecting consumers.
- The project also provides improved techniques for threshing and drying to improve the quality of banana and fonio products. This includes methods of measuring the impurity of products and correctly cleaning the product before transformation. Finally, FAO provides equipment such as solar drying units, which helps improve product quality.

Related challenges:

- High demand but limited supply of higher quality products: Banana and fonio products are quite new and rare within Senegal. The aim is therefore to improve the quality of these products, so that they may be more accessible to the wider population.
- Lack of technical capacity and infrastructure: Creating products that are of higher quality and meet safety standards requires resources, which small-scale producers often lack. Therefore, the goal of the project is to provide producers with the capacity and infrastructure to create high quality products.

Related good practices:

- Quality control from the beginning of the supply chain: Much of the focus on product quality enforcement can fall on products at the end of the supply chain. However, this project focuses on ensuring that producers follow quality and safety standards from early on in the production process.

- Product quality for competitiveness: Meeting quality and safety standards can be expensive and resource-intensive. However, the goal of the project is to help producers understand that improved product quality can lead to increased competitiveness.

7.1.3. Larger Industries

In **Olam's food packaging division**, food safety is a top priority, focusing on three key areas: (1) Hazard Analysis at Critical Control Points (HACCP) to address accidental food contamination at every stage, (2) Threat Analysis at Critical Control Points, and (3) Vulnerability Analysis at Critical Control Points. Olam defines quality as the extent to which the content and product meet the requirements that would be aligned to the Food Safety System certification (FSSC) 22000. These require three aspects: customer, regulatory, and processing requirements. Customer requirements involve understanding the target consumers and their preferences through market research, differentiating products to meet consumer demands. Regulatory requirements focus on ensuring alignment with regulatory entities such as the FDA and Ghana Standards Authority. Processing requirements include the standards for raw materials and ingredients used in the production process. Olam complies with safety measures by looking at the existing standards in place; if Ghana does not have a standard for a particular ingredient, international standards are considered. Technical committees provide advice, such as mandatory nutrition information. Olam ensures compliance with these standards by undergoing annual audits by selected certification agencies and through surveillance. Additionally, Olam develops an Environmental Management Plan (EMG) every year to monitor outcomes against the plan and ensure environmental sustainability practices are followed.

Partners for Food Solutions (PFS) is an organization based in Ghana, formed by seven global companies: General Mills, Cargill, Hershey, Buhler, Ardent Mills, DSM, and The J.M. Smucker Co. The organization provides technical assistance for food processing, connecting expertise to clients and monitoring their performance after the collaboration period comes to an end. PFS serves companies in 11 countries, which include Ghana, Côte d'Ivoire, Senegal, Nigeria amongst others. The model is based on the recruitment of food technology experts to identify food processing company "clients" with different challenges.

7.2. Opportunities

There are several opportunities to improve food quality and safety in the region, including consumer demand and awareness, and the creation of collaborative platforms.

7.2.1. Consumer Demand and Awareness

Many lower-middle income countries have experienced a trend of consumer demand for higher quality and safety products, which can be one of the best drivers to promote better production and regulation (GFSP 2019). There is therefore potential for consumer demand to increase the incentives for higher quality and safety of products within West and Central Africa. An example is a study conducted within five African countries, including Ghana, Nigeria, and Cameroon, that

highlighted how COVID-19 led to more knowledge on and behavior change towards the importance of hygiene of food products (Kamgain et al. 2022).

7.2.2. Collaborative Platforms

Although food safety issues cause $16.7 billion in losses in Africa every year, there is still a lack of strong partnerships to tackle food quality and safety (GFSP 2019). Global platforms that coordinate efforts for food safety capacity-building struggle with access to funding, among other challenges. For example, the Global Food Safety Partnership no longer exists. However, there is a large potential for building networks across countries that could facilitate surveillance, monitoring, and research. In Senegal, for example, there is a potential for the creation of a collaborative platform such as CERFAM but focused solely on food quality and safety.

7.3. Good Practices

Stakeholders interviewed emphasized the importance of product quality and safety for competitive purposes, as well as the significant role of stakeholder collaboration throughout the value chain in achieving these goals. Additionally, they highlighted the readiness of the policy environments in Ghana and Senegal, with active involvement of governments in publishing material related to food quality and safety.

Figure 7: Summary of Food Quality and Safety Good Practices

7.3.1. Implementation

Producer Training and Endogenous Practices

Stakeholders from both FAO and SFA highlighted the importance of providing baseline training for producers and accompanying farmers from the start of the process to help ensure quality. Additionally, both stakeholders from ASN and FAO stressed the importance of using existing practices and improving them, rather than starting from scratch, as well as creating feasible and contextually appropriate solutions.

There is now increasing awareness that technology includes not only energy sources and tools, but also knowledge, skills, and social organizations. It is therefore imperative to approach local

communities as partners and collaborators in all food security endeavors in order to realize the objective of sustainability. Communities across West and Central Africa have been using various processes to preserve the quality of food, including pickling, curing, smoking, drying, salting, and fermentation (Adeyeye 2017). These aspects need due recognition and full understanding and utilization, especially in African communities. Insufficient attention has been given to local knowledge within the mainstream food security development and management interventions. As such, local knowledge and practices in food technology that have proved capable of ensuring food security need to be implemented before considering the introduction of external ones. Emphasis of the same should be especially made for foods that are adapted to local conditions. This can also be a cost-effective measure, as teaching external methods and providing new machinery can be costly.

7.3.2. Environment

Synergies, Collaboration, and Multisectoral Partnerships

Multi-stakeholder collaborations are essential in ensuring food quality and safety, given the involvement of multiple stakeholders across the supply chain. Collaborations between different types of stakeholders have proven to be effective, with partnerships between various government entities, PPPs, social impact partnerships, and technology-enabled partnerships highlighted the most in interviews.

The partnership between the FDA and GSA in Ghana is an instance of working together once a policy has been launched, with GSA factoring the new framework into their standards and providing baseline requirements for the FDA to enforce. The FDA frequently partners with the private sector, such as packaging companies, to ensure flexible packaging that meets standards and enables the FDA to execute its mandate while allowing players to grow.

Partners for Food Solutions (PFS) is an example of a non-governmental organization (NGO) in Ghana that has built a successful partnership model between the nongovernmental, private, and finance sectors. The organization relies on private sector sponsorship, volunteer time, and investor funding to provide advisory services to local processors. The increased number of processor clients and private sector volunteers suggests the model is effective. PFS also developed a remote system and communication network that enables efficient coordination and collaboration between private sector volunteers and local producers, across different countries and time zones.

As with food fortification, stakeholders underscored the importance of partnerships for food quality and safety measures. The Senegalese Standards Association (ASN) collaborates closely with a diverse range of stakeholders and stressed that the work would not be successful if any stakeholder within the value chain was excluded. Partnerships between the private sector, research institutes, and banks are particularly important. Finally, partnerships at the regional level are key for norms harmonization.

Product Quality as a Competitive Advantage

Many stakeholders have emphasized the importance of product quality as a key factor in achieving a competitive advantage in the marketplace. They believe that focusing on improved quality can help distinguish themselves from their competitors both at a national and regional level. Producers are becoming increasingly aware that consumers are sensitive to quality, and that quality failures could lead to reputational issues.

Another important aspect of achieving high-quality products is developing innovative solutions to incentivize producers to focus on quality. For example, the ASN in Senegal highlighted its National Quality Oscars, where companies are given prizes every year to reward them for good quality practices. This serves as a powerful marketing tool and incentivizes producers to focus on product quality. In addition, GSA is planning a new initiative called Graduator Certification, which is intended to ease the process of meeting different standards for producers. Instead of expecting the manufacturer to meet all criteria at once, GSA assists them in graduating at each stage based on meeting different requirements.

Mechanisms to trace products and ensure better quality were also highlighted as good practice. For instance, the SFA in Senegal focuses on the traceability of their products to ensure better quality control and promote overall product quality, while OLAM in Ghana has also developed instant feedback mechanisms for tracking product quality compliance standards. This enables them to receive timely feedback on the quality of their products, allowing them to take corrective actions in real-time and ensure compliance with standards.

Interest and Political Will

In both Senegal and Ghana, there is a growing interest and political will in the food quality and safety sector. For instance, a stakeholder from ITA in Senegal noted that the Ministry of Commerce is very responsive to quality control issues and does not wait for the support of ITA to act. Furthermore, there is a strong interest from the government in developing food quality and safety standards. Various ministries and statutory bodies periodically publish guidelines on food quality and safety for relevant stakeholders. In Ghana, stakeholders repeatedly mentioned that the policy environment as it pertains to food quality policies was successful, highlighting the different guidelines that have been put in place.

7.3.3. Capacity

Impact Monitoring

Stakeholders from the FDA in Ghana mentioned that they monitor their activities through yearly evaluations of compliance. The agency monitors whether companies are using practices that are compliant and through that, verifies if they understand what the FDA has been communicating and that they have adopted them. The education team also receives feedback informally from producers and consumers and stores this data, as it is a requirement from ISSO. The FDA maintains a database of those complying and those not complying for different products, which helps them identify focus areas. The FAO also has a strong data management system, supported

by the Field Project Management Information System (FPMIS), which serves as the main monitoring tool used across the organization.

7.4. Challenges

There are several challenges in designing, implementing, and scaling food quality and safety initiatives. On the implementation side, there is a lack of advocacy and awareness on the topics among consumers, issues of quality control throughout the supply chain, and tradeoffs between consumer preferences and product quality. On the environment side, there are challenges regarding political will, accessibility, collaboration, and harmonization. The region also lacks the capacity needed to implement best practices and there is a need to improve the frequency and accessibility of data, technical and financial support, and human resources.

Figure 8: Summary of Food Quality and Safety Challenges

7.4.1. Implementation

Lack of Advocacy and Awareness

There are difficulties in changing producer and consumer practices related to food quality and safety. For producers, there is less advocacy in rural areas to promote improved standards. In fact, few food quality and safety projects in the region address informal markets, places where those projects may be needed most (GFSP 2019). Change is particularly difficult when there are language and cultural differences, meaning indigenous manufacturers know little about the standards that they need to follow. There is also an issue of a lack of incentives or rewards for producing higher quality and safer food within these communities, as noted by stakeholders from Partners in Food Solutions. In particular, it is difficult to accept a change in quality management culture when there is a focus on profit. There is a similar issue for consumers, especially those in rural areas. Knowledge about consumer demand for food quality and safety is often limited, which is a major cause of food contamination. (Ortega and Tschirley 2017, Cudjoe et al. 2022).

Quality Control and Traceability throughout the Supply Chain

Many stakeholders mentioned the difficulty of quality control and traceability across the entire supply chain. During the interview with GHS in Ghana, it was revealed that adequate quality assurance and control processes at the production level was still a challenge. In Senegal, there is an issue with the regulation of the maximum amount of aflatoxins coming from maize and groundnuts (FSIL 2020). In addition, it is well known that the quality of products deteriorates along the supply chain, especially with intermediaries in terms of transportation and storing of foods, as noted by a stakeholder from the FAO. The lack of traceability is also a concern for actors who face pressure or reputation risks if there is a sudden identified problem with poor food quality and safety. All of these issues are related to a lack of capacity, monitoring data, and financing (see capacity section below).

Tradeoff between Quality and Consumer Preferences

On the consumer end, there is a tradeoff regarding quality control: the issue is finding a middle ground where consumers want to buy products and those products are of sufficiently good quality. A stakeholder from ITA in Senegal gave the example of a tradeoff with high-quality oil: consumers and sellers like to see the color of the oil that they are buying, however, it is suggested that distributors use opaque bottles to avoid quality degradation. A stakeholder at OLAM in Ghana also noted that consumer preferences and perceptions can change quickly, and it can be difficult to continuously redesign products that still meet standards.

7.4.2. Environment

Lack of Legislation and Political Will

In Ghana, much of the legislation is outdated and needs to be updated. This may have to do with the lengthy process required to create new policies or update existing ones. Policy must be accepted by Parliament before being approved, which can take a considerable amount of time. For example, the Food Safety Project was introduced in 2015 and only accepted in 2020.

Overall lack of political will was listed by a majority of survey respondents as one of the largest challenges to successful food quality and safety policies and programs. This may be because leadership does not have the capability to prioritize these topics due to resource constraints, which can hamper the enforcement of food quality and safety standards (GFSP 2019, Cudjoe et al. 2022). As the interviewees from FDA in Ghana noted, politics can get in the way of continuity, especially when the party which implemented the program is no longer in power.

Economic and Physical Accessibility

As with fortified food products, the high costs of transformation that are needed for high quality and safety of products can lead to unaffordable prices for consumers at the end of the supply chain. In addition, according to stakeholders in Senegal, even when there is high demand for high quality food, quantity is sometimes limited, especially for transformed products in rural areas. For example, a stakeholder from FAO noted that the transformation of high-quality fonio is very difficult, which means only small quantities are produced.

Partnerships and Coordination

While there are many partnerships and collaborative platforms that exist to discuss issues of food quality and safety, there are not as many as there are for food fortification. Even when partnerships exist, there is a lack of understanding of each stakeholder's mandate, which can lead to duplication of efforts. There are also issues with absence of information sharing between stakeholders and slow timelines for approvals of policies and programs, especially in Ghana.

Donor Relationships and Investments

In Ghana in particular, a few stakeholders mentioned the lack of a participatory approach between donors, which can lead to a misalignment of funders' project timelines with agricultural harvesting times, as an example. Many experts in the region suggested there was little donor coordination based on a lack of a clear mandate and alignment with regional priorities (GFSP 2019). Unfortunately, this means many investments are geared towards topics such as export commodities, and fewer investments are targeted at local consumption, although this is slowly changing over time (FSIL 2020, GFSP 2019).

Lack of Harmonization of Standards

As noted in the policies section, there are several regional food quality and safety policies, but countries must adopt these at the national level and enforce them for them to be effective. This means that not all countries within the region have the same food quality and safety standards. OLAM in Ghana exports its products to Togo, Mali, and Côte d'Ivoire, but given the lack of harmonization on standards, the export process can be complicated. In this case, efforts are made to reach a middle ground to try and meet a majority of standards. In Senegal and Ghana, given the size and innovation of the food sector, some standards are not yet elaborated.

7.4.3. Capacity

Frequency and Availability of Data and Monitoring and Evaluation

As with food fortification, there is a lack of data and monitoring and evaluation systems to collect and analyze data related to food quality and safety. Organizations also have different capacity levels in data collection and data management, mostly related to lack of infrastructure and funding. For example, GSA in Ghana looks at how many stakeholders are conforming to standards and how many are engaged, but does not have documented procedures to show the exact outcomes of their activities. In other cases, indicators are more focused on outputs rather than impact. This lack of data can then inhibit political and donor will (FSIL 2020). There is data lacking on the impact, cost, and effectiveness of food quality and safety programs that exist, as well limited research on food safety within transport stations in the region (FSIL 2020, Ncama et al. 2021). In addition, although there is much research focusing on microbial safety, there are fewer studies on food storage, food safety, and hygiene practices (Ncama et al. 2021).

Lack of Technical and Financial Support

There is a lack of government- or donor-funded support services to train producers on food quality and safety (GFSP 2019). For example, producers at the industrial level do not have the requisite

capacity to undertake internal quality control. There is a lack of technical support for enforcement of food quality and safety norms, especially in rural areas or for smaller producers. This is related to poor infrastructure, which was listed as one of the top challenges among survey respondents. There is also a lack of technical capacity for conducting risk assessments and identifying items such as mycotoxins in food products (Wagacha and Muthomi 2008).

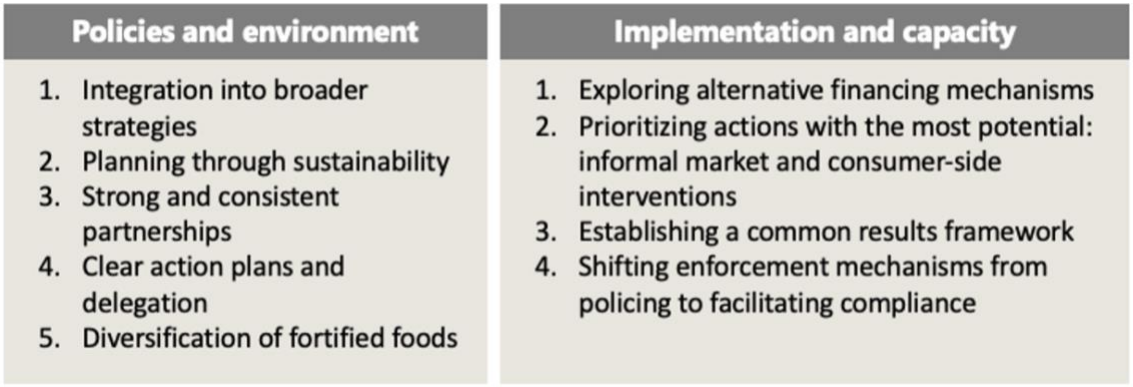
There has also historically been a lack of financial support and donor investment for food quality and safety measures. According to the Global Food Safety Platform database, between 2010 and 2017 international donors spent $383 million to support 323 projects to improve food safety throughout Africa (FSIL 2020). The Global Food Safety Partnership itself did not receive enough funding to implement suggested measures and conduct research. This issue was especially noted in Ghana and Senegal, where a lack of financing hampered the effectiveness of normalization, enforcement, and capacity-building support. In Ghana, the Ministry of Agriculture noted that there was a gap between the funding requested and the funding needed, because costs such as transportation and accommodation were not considered. Finally, there is the issue of sustainability of funding, especially after donors' and international partners' projects end.

Lack of Human Resources

Finally, there is a lack of human resources working specifically on food quality and safety issues, particularly at the enforcement level. There is a need for increased staff within food safety authorities both in centralized and decentralized levels for producers, but also within consumer-facing retail stores (Kussaga et al. 2014).

8. Recommendations

Figure 9: Overview of Recommendations



8.1. Environment and Policies

As shown in the challenges sections, there are a number of gaps related to the environment of food fortification, and food quality and safety initiatives. These challenges include lack of legislation and political will, economic and physical accessibility, and partnerships and coordination (including with investments and standards harmonization). Given these, the study suggests the following:

- **Fortification must be integrated into broader strategies of food system transformation**, recognizing the need to address systemic issues beyond fortification alone. As shown in the Nutrition Conceptual Framework (Figure 2), fortification programs and policies are one part of a holistic nutrition strategy, but our research found that the food security and nutrition sectors often worked in silos. This integration can be achieved through multi-sectoral programs and interventions that involve collaboration among various stakeholders. Mechanisms should be established to improve the marketing of fortified foods, including labeling, packaging, traceability, digitalization, infrastructure, and promotion, to enhance consumer awareness and acceptance. Fortification should be included in relevant health programs, such as ante-natal and postnatal counseling and infant/young child feeding programs. Lastly, creating an enabling policy, legal, and financial environment that supports and incentivizes food fortification efforts is crucial.

In addition, consolidating partnerships with the private sector will support improved financing.

- Scaling up advocacy, partnership, and knowledge-sharing through **strong and consistent partnerships between government and the private sector** is essential. The team recommends an increase in the PPP models in the nutrition space, similar to PFS, which has successfully been launched as a result of pooled funding and volunteers from seven different private companies. Additionally, leveraging the interest and focus of impact investing firms to obtain additional funding to support the processors as PFS has done, is also recommended.

There are also several recommendations for enhancing the policy environment at the regional level:

- As highlighted in various interviews, a major challenge in the area of partnerships and collaborations is the overlap of roles and responsibilities, leading to duplication of efforts. It is therefore crucial to develop **a clear action plan** with roles, responsibilities, accountability, timelines, and funding strategy, including multi-sectoral investment plans. Delegation based on areas of expertise can help avoid duplication and fill gaps. In Senegal, for example, there is a potential for the creation of a collaborative platform such as CERFAM, but focused solely on food quality and safety.
- At a regional level, the **creation of a supportive facility** is needed to facilitate knowledge sharing, coordination, and harmonization of policy frameworks. This would include better access to information on the benefits of food fortification, regional harmonization of fortification standards, and inter-institutional coordination. CERFAM could play a central role in bringing together existing regional knowledge-sharing platforms.
- **Diversification** of the types of foods that are fortified is crucial, with a focus on increasing penetration into different food products to reach a wider population. Efforts to fortify rice at a regional level should be continued, as rice is a staple food in many regions and can be an effective vehicle for fortification. The African Union should be entrusted to formally spearhead and oversee fortification efforts in Africa, providing leadership and coordination at a continental level.

8.2. Implementation and Capacity

There are also a number of gaps when it comes to the implementation and capacity of food fortification, and food quality and safety initiatives. Implementation challenges include a lack of advocacy and awareness on the topics among consumers, lack of incentives for producers, issues of quality control, and tradeoffs between consumer preferences and product quality. Capacity challenges include a need to improve the frequency and accessibility of data, technical and financial support, and human resources. This study's recommendations therefore aim to address some of these challenges.

Financing of projects is a key barrier to improved project implementation and stakeholder capacities. According to the World Bank's Nutrition Financing in Senegal report, there are three main options for increasing budgetary resources in Senegal: (1) the establishment of new nutrition projects; (2) increasing funding for existing projects or projects being finalized; and (3) upgrading and initiating nutrition-sensitive interventions in projects and programs implemented in sectors such as agriculture, fisheries, livestock, and research and education (Offosse 2018). As shown in the report, very little funding is designated to food fortification and food quality projects. Consequently, **creating programs that are specifically linked to these themes, especially in rural areas and at the community level, may help establish improved funding**.

- Additional budgetary resources could come from the **World Bank's Global Financing Facility,** which could lead to increased pooled donor funding for public sector management activities, including nutrition.
- **Planning for sustainability**, including long-term strategies and approaches, is crucial. Many stakeholders in the nutrition sector have highlighted the impact that long-term

financing can have on adequate planning, financing, and M&E. We recommend working with government stakeholders to create budget lines dedicated for food security and food quality and safety and creating greater accountability and sustainability through budget appropriation (Deussom et al. 2018), rather than relying on donor funds. For instance, FAO in Ghana has now incorporated sustainability as a key component of projects, so that progress does not regress when funding priorities change.

There were also several gaps in terms of the focus areas of current programs and initiatives, particularly in the informal market.

- In the food fortification sector, there is a need to focus not only on large-scale fortification efforts, but also on fortification projects at the community, household, and local levels, including incentives for artisanal production and quality efforts. **Actions and investments should be prioritized where fortification has the greatest potential to impact nutrition**, such as supporting innovative projects and businesses that invest in production, processing, packaging, and distribution of nutrient-rich foods. One example is Obaasima in Ghana, which works to fortify food products that are affordable and accessible to WRA. Agricultural input support programs should integrate biofortified seeds and training activities, and public procurement from farmers producing biofortified and fortified foods should be encouraged for incentivization purposes. More specifically, massive investment in infrastructure and modern rice processing and fortification facilities is needed. In terms of future fortification efforts, a holistic delivery model should be built to ensure access to fortified rice in local markets (CERFAM 2021b).
- Overall, **more emphasis should be placed on consumer-side interventions**, such as social and behavior change communication and education. This may include lowering the cost of fortified products to make them more accessible to consumers.

The team's analysis highlighted the lack of available data and M&E systems and tools.

- **Establishing a common results framework** at the national level could help streamline efforts and integrate the multiple committees that oversee fortification. This will require communication between national ministries including the Ministries of Agriculture, Commerce, and Industry to produce and use data for monitoring and evaluation, including data gathering. The 50x2030 Initiative is a collaborative effort between the International Fund for Agricultural Development (IFAD), FAO, and the World Bank to promote the production, analysis, interpretation, and use of agricultural data. The initiative is already working with ministries and their agricultural data departments (50x2030 2023). Therefore, the team recommends that regional and national stakeholders focusing on food fortification and food quality and safety work with the initiative to improve access to data and establish improved M&E systems.
- **Regarding the food quality and safety sector, more data and projects are needed** to support regional efforts. The extent of contamination in foods produced and consumed should be documented, and rigorous testing of scalable pre- and post-harvest strategies to improve production practices and increase the safety of crops for food and feed should be conducted. This will also help to better understand where investments for technical capacity building are needed.

Finally, stakeholders should work together to improve the enforcement capacity of national and regional bodies.

- There is a need for enforcement on standards and norms to ensure consistent quality standards, facilitating easier imports and exports. **Accountability and enforcement mechanisms should shift "from policing to facilitating compliance"**, reforming food safety regulatory practices to create a supportive environment for compliance (Jaffee et al. 2019). Creating a supporting environment for compliance may include investing in public awareness campaigns and technical capacity building, especially in rural and informal markets. This will lead to improved quality control and traceability.

9. Conclusion

This report demonstrates the multifaceted nature of nutrition resilience within the Central and West African context when it comes to food fortification, and food quality and safety. Resulting from the team's desk review, survey, and interviews, the report highlights eight good practices actively employed by stakeholders in the region to implement successful nutrition initiatives, as well as a series of recommendations for how to improve food fortification, and food quality and safety in the region.

Future research may address certain points that could not be expanded on in this report, including:

- More information on buyers, intermediaries, and food market stakeholders,
- More information on countries in the Central and West African region outside of our three case study countries,
- How issues and good practices vary across commodities, and
- How results and recommendations overlap or differ from other related nutrition topics.

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