

Food Fortification in West Africa

Progress and lessons learned

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Key Messages

- This paper discusses the roles of key stakeholders and essential processes at the national and regional level that have advanced large-scale food fortification across West Africa, while highlighting important lessons learned that may be applicable to other countries and regions.
- Significant progress has been achieved in food fortification in West Africa over the past 15 years through regional commitment and leadership complemented by national level action.
- While most countries in West Africa have mandatory fortification legislation, fortification is an evolving, dynamic process that requires continuous evidence-informed reassessment of performance, priorities and impact.

Introduction

Fortification in West Africa

Micronutrient deficiencies are key contributors to increased morbidity, reduced productivity and premature death in West Africa.¹ Iron deficiency anemia accounts for 20% of all maternal mortality in West Africa while over 40% of children in the Economic Community of West African States (ECOWAS) region are at risk of vitamin A deficiency.² In addition to nutrition education, dietary diversification, micronutrient supplementation and public health measures such as deworming, food fortification has been an important strategy for improving nutritional status in West Africa.

The West African Health Organization (WAHO) and international partners organized a public-private sector dialogue on food fortification in 2002, the same year Nigeria became the first country in the region to mandate fortification of wheat flour, vegetable oil, sugar and maize flour. The West African Economic and Monetary Union (UEMOA) Commission subsequently supported the development of subregional fortification standards, quality assurance and quality control (QA/QC) guidelines and a fortification logo. Capacity-building of industry and regulatory bodies followed, as did mobilization of national fortification alliances, consumer associations and the public. Harmonized regional fortification standards are now in place across the ECOWAS zone.

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Regional stakeholders

WAHO

As the official health body of ECOWAS, WAHO has been front and center in advancing food fortification in West Africa since its member ministers of health passed a resolution in support of universal salt iodization in 1994. WAHO co-organized public-private sector dialogues on food fortification in 2002 and 2007 and passed another health ministers' resolution in 2006 for mandatory fortification of vegetable oil and wheat flour. WAHO carries significant political influence on national level health and nutrition policies, and the political leadership it has shown in support of food fortification has translated into national-level action.

UEMOA

Covering the subregional West African Franc zone of eight countries, the UEMOA Commission has contributed nearly US\$1 million over the past five years in support of food fortification, rallying countries and industry around fortification, strengthening

technical capacity of the public and private sectors, raising consumer awareness and harmonizing standards. UEMOA convenes country fortification focal points, industry and regional industry associations twice yearly to review the status and progress of food fortification in the region.

Regional industry associations

The UEMOA Commission has also worked closely with two regional industry associations: the Professional Millers Association (AIM-UEMOA) and the Professional Oil Producers Association (AIFO-UEMOA), both of which have actively supported food fortification. In fact, AIFO-UEMOA called on its member industries to begin fortifying oil voluntarily in 2006, before any UEMOA country had mandated it.

ECOWAS

The ECOWAS Commission, and its departments of Industry and Private Sector Promotion, Trade, and ECOSHAM, have been instrumental to fortification standards harmonization across all 15 member countries. ECOWAS is now considering bouillon, sugar and maize flour fortification standards, adoption of the ENRICH I fortification logo, regulation for fortified foods subject to harmonized standards, and development of ECOWAS-wide QA/QC fortification guidelines through the West Africa Quality System program.

International organizations

Numerous international agencies have played important roles in food fortification across West Africa, supporting capacity-building, evidence generation, monitoring and surveillance, convening stakeholders, advocacy and equipment procurement. These partners include Helen Keller International (HKI), UNICEF, Nutrition International, the Global Alliance for Improved Nutrition (GAIN), the Food Fortification Initiative (FFI), the International Federation for Spina Bifida and Hydrocephalus and Smarter Futures consortium, Project Healthy Children, and the International Micronutrient Malnutrition Prevention and Control (IMMPaCt) program of the United States Centers for Disease Control and Prevention.

Regional efforts in support of food fortification

Harmonized regional fortification standards

In 2009, the UEMOA Commission developed standards for fortified vegetable oil and wheat flour, aligned with WHO recommendations,^{3,4} which were then mandated by all eight member countries. Building on UEMOA's success, a workshop was organized in late 2013 to reach consensus on and plan the process for harmonizing standards for fortified wheat flour, vegetable oil and iodized salt across the entire 15-member ECOWAS community through the ECOWAS Harmonization

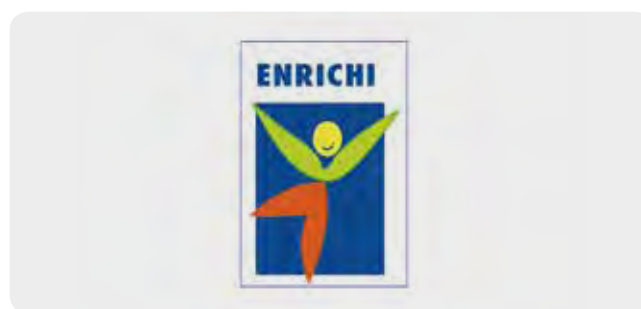
Model (ECOSHAM), the framework for aligning commodity standards in the region.

In 2014, vegetable oil, wheat flour and salt were formally introduced into the ECOSHAM process. During numerous technical meetings, current fortification standards for these commodities were reviewed and initial harmonized standards developed. Following public review in each country, the standards were revised and a formal ECOWAS standard developed and submitted to the Regional Technical Harmonization Committee on Food Products for endorsement by all 15 member-country representatives. These standards were then adopted by the ECOWAS Ministers of Industry before final endorsement by the Council of Ministers for African Integration. Following this two-year process, countries are now obliged to modify their legal frameworks (laws, decrees, etc.) to incorporate the new standard.

Regional fortification logo

In order to raise awareness and facilitate identification of fortified foods, UEMOA developed the ENRICH I fortification logo (Figure 1). The logo is a registered trademark with the African Intellectual Property Organization, and UEMOA developed guidelines on use and control of the ENRICH I logo. Wheat millers and oil producers in all eight UEMOA countries utilize the logo, which has also been adopted by three non-UEMOA countries: Cape Verde, Guinea, and Liberia. In another example of sub-regional (UEMOA) fortification initiatives resulting in regional (ECOWAS) uptake, ECOSHAM is now considering adoption of the logo for the entire ECOWAS region.

FIGURE 1: ENRICH I fortification logo



Regional QA/QC guidelines

The UEMOA Commission also developed regional guidelines on wheat flour, salt and vegetable oil fortification to promote consistent and quality production of fortified staples. Draft guidelines were developed by the Commission and then extensively reviewed by national-level technical committees. The guidelines cover fortification operational processes; micronutrient premix procurement, storage and handling; quality control, sampling and analysis; record-keeping; labeling with the EN-

TABLE 1: National-level regulatory status on food fortification in ECOWAS member states

ECOWAS countries <i>(UEMOA italicized)</i>	Status of fortification regulation (year mandated)			
	Vegetable oil	Wheat flour	Sugar	Maize flour
<i>Benin</i>	Mandatory (2012)	Mandatory (2012)		
<i>Burkina Faso</i>	Mandatory (2012)	Mandatory (2012)		
<i>Côte d'Ivoire</i>	Mandatory (2007)	Mandatory (2007)		
Cape Verde	Voluntary	Mandatory (2014)		
The Gambia	Voluntary	Voluntary		
Ghana	Mandatory (2006)	Mandatory (2006)		
<i>Guinea-Bissau</i>	Mandatory (2014)	Mandatory (2014)		
Guinea	Mandatory (2012)	Mandatory (2005)		
Liberia	Mandatory (2014)	Mandatory (2014)	Mandatory (2014)	
<i>Mali</i>	Mandatory (2017)	Mandatory (2011)		
<i>Niger</i>	Mandatory (2012)	Mandatory (2012)		
Nigeria	Mandatory (2002)	Mandatory (2002)	Mandatory (2002)	Mandatory (2002)
<i>Senegal</i>	Mandatory (2009)	Mandatory (2009)		
Sierra Leone	Mandatory (2011)	Mandatory (2011)		
<i>Togo</i>	Mandatory (2012)	Mandatory (2012)		

RICHI logo; and packaging and distribution of fortified oil and flour and iodized salt.

QA/QC capacity-building of the public and private sectors

Utilizing the regional QA/QC guidelines, the UEMOA Commission and partners have organized numerous national- and regional-level workshops for the private and public sectors on QA/QC and Good Manufacturing Practices in wheat flour and vegetable oil fortification. Recognizing that quality is everyone's responsibility, participants have included representatives from food control agencies, regulatory and standard-setting bodies, customs departments, consumer associations, industry and importers.

National stakeholders

Government

At the country level, many sectors and agencies within the government are critical to fortification. Often, the ministry of health is the first involved, as fortification is considered a nutrition intervention. Ministries of trade, industry, finance and agriculture are subsequently engaged, while standard-setting bodies, regulatory agencies, customs departments and reference laboratories also play critical roles.

Industry

Without industry, there would be no fortification. Industry is, therefore, engaged from the beginning to ensure buy-in, boost capacity, and engender understanding, ownership and compliance. Moreover, standards, compliance requirements and regulations must be feasible, further necessitating active engagement with industry. In addition to millers and oil producers,

importers, premix suppliers and analytical equipment suppliers have been engaged.

Fortification alliances

Multisector food fortification alliances are functional in most countries in the region and serve as platforms to review and prioritize food fortification activities, ensuring that fortification remains on the national agenda. Alliances have contributed to the development of fortification strategic plans, updating of legal frameworks in alignment with UEMOA and ECOWAS standards, and monitoring of program progress and performance.

Consumer associations and civil society

For fortification to be successful, there must be public demand and support for the process. Even mandatory fortification can fail if there is widespread misunderstanding of it, or resistance to it, by industry, the public, or civil society. Consumer associations and civil-society organizations thus play critical roles in raising awareness, advocating for improvements and monitoring performance. Civil society organizations can also promote demand for fortified foods through their nutrition-based social and behavior-change communication activities.

National-level efforts in support of food fortification

FRAT surveys

As one of the first steps of food fortification, many countries in the region conducted Fortification Rapid Assessment Tool (FRAT) surveys to identify food fortification vehicles. These nationally representative, cross-sectional cluster surveys assessed consumption patterns of children and women of reproductive

TABLE 2: Examples of standards in the ECOWAS region

Country region	Wheat flour			Vegetable oil	Sugar	Maize flour
	Iron (ppm / form)	Folic acid (ppm)	Additional (ppm form)	Vitamin A (ppm)	Vitamin A (ppm form)	(ppm form)
UEMOA	60 (FF, FS, EL)	2.5		11–24		
ECOWAS	60 (FF/FS) 40 (EDTA)	2.6		11–24	7.5 (Retinyl palmitate)	
Ghana	58.5 (FF)	2.08	Vit. A (2.0); Zinc (28.3); B ₁₂ (0.01); Thiamine (8.4); Niacin (59); Riboflavin (4.5)	10.0		
Nigeria	40 (NaFeEDTA)	2.6	Vit. A (2.0); Zinc (50); B ₁₂ (0.02); Thiamine (6); Niacin (45); Riboflavin (6)	20,000 (IU/kg)	25,000 IU/kg (Retinyl palmitate)	Vit. A (2.0); NaFeEDTA (40); Folic acid (2.6); Zinc (50); B ₁₂ (0.02); Thiamine (6); Niacin (45); Riboflavin (6)
Liberia	60 (FF); 40 (NaFeEDTA)	2.6	B ₁₂ (0.04); Zinc (95); Thiamine (8.5); Niacin (59); Riboflavin (5)	20 (Retinyl palmitate)	15 (Retinyl palmitate)	

age through 24-hour recall and weekly food frequency, with the goal of identifying major potential food vehicles to deliver vitamin A, iron, B-complex vitamins and zinc. In Senegal, for example, wheat flour, vegetable oil, sugar, bouillon and tomato paste were all assessed. Across West Africa, wheat flour and vegetable oil were prioritized for fortification since they were consumed by large proportions of the population at consistent daily amounts and were free of negative perceptions. Fortification was also determined to be feasible technically and affordable to industry and consumers. Political will existed within governments and the private sector. Importantly, feasibility was reflected in the structure of the flour and oil industries: centralized, large-scale producers covered the vast majority of population needs.

Mandatory fortification legislation

Parallel with or subsequent to the development of regional fortification standards by UEMOA, country governments began legally mandating wheat flour fortification with iron and folic acid and vegetable oil fortification with vitamin A. Some countries also permitted wheat flour fortification with zinc (Benin, Guinea, Liberia, and Sierra Leone) or vitamin A (Ghana and Nigeria).

Nigeria and Liberia also mandate fortification of sugar and Nigeria additionally mandates maize flour. Both regional bodies and international organizations supported national standards bodies, food control agencies and ministries of health and trade to develop the fortification standards (or adopt regional standards) and enact the necessary legal framework (decrees or laws). As **Table 1** shows, 14 of the 15 ECOWAS countries now have mandatory wheat flour fortification, and 13 of 15 mandate oil fortification. For those countries without mandatory fortification, fortification may be voluntarily practiced, but must follow the regional standards.

Industry capacity-building

In addition to developing fortification legislation and standards, significant capacity-building of fortifying industries was conducted to improve fortification processes, strengthen QA/QC and food safety practices, and ensure understanding of fortification requirements. Industry capacity and technological assessments were conducted to identify and then address plant, equipment and training needs, including procurement of fortification equipment and premix; aggregation of premix

orders to ensure economies of scale and purchase of quality, accredited inputs; installation and testing of equipment; and QA/QC sampling and testing. Plant staff were trained in fortification processes, equipment maintenance, QA/QC, food safety, Good Manufacturing Practices and Hazard Analysis and Critical Control Points. Public- and private-sector representatives were often invited to joint trainings to ensure common understanding of each other's roles and responsibilities, thereby promoting cohesion among stakeholders.

Government capacity-building

In addition to building industry capacity, training of food control and regulatory agencies was organized to reinforce external quality control, regulatory monitoring and compliance enforcement. At both national and regional trainings, standards body, food control, reference laboratory, and customs staff were trained on national-level and UEMOA standards for wheat flour and vegetable oil fortification, quantitative and qualitative analytical techniques and tools/equipment for monitoring micronutrient levels in fortified foods, inspection and control procedures at borders and ports, and compliance enforcement.

Communications and awareness-raising among importers, consumers, and the media

Sensitization workshops were organized across the region to improve importer awareness of country and regional fortification requirements. Consumer associations and journalists were also sensitized to expand communication channels with the public on the importance and recognition of fortified foods. The journalists subsequently published articles in print media and aired radio and television spots on fortification.

National communications campaigns promoting awareness and consumption of fortified foods and recognition of the ENRICH logo were organized by many countries in the region. The goal was primarily to engender support for food fortification and communicate the importance of micronutrients for nutrition and health. In Burkina Faso, for example, the national fortification alliance and several consumer associations organized television and radio broadcasts in French and local languages. In Senegal, mass media and social marketing tools were developed to promote consumption of fortified foods and 13 consumer associations and civil society organizations sensitized on use of the tool. Africable cable news channel organized a caravan that traveled to multiple countries across West Africa engaging consumers in major cities while conducting live broadcasts on food fortification and the ENRICH logo.

Monitoring

External quality control by regulatory bodies is essential to enforce compliance, as is control of imported foods through in-

spection agencies which have been equipped with and trained in the use of qualitative and quantitative testing methods to ensure conformity with standards. The UEMOA QA/QC guidelines cover procedures for inspection and control, serving in some countries as the basis for compliance enforcement and reporting. Results of monitoring are reported through some national fortification alliances, but not in all countries.

Since 2014, Fortification Assessment Coverage Toolkit (FACT) surveys have been conducted in four countries (Senegal, Côte d'Ivoire, Burkina Faso, and Nigeria) at the national or subnational level to measure the current effective coverage of fortified foods on the market, as well as to explore the potential of other industry-manufactured foods for fortification based on market penetration, industry/trade production patterns and consumption patterns. The results varied widely across countries but demonstrated an important ongoing need for improvements in fortification coverage and quality.⁵

Lessons learned from fortification in West Africa

A continuously evidence-based and evidence-informed system

Evidence is essential to inform the design of, demonstrate the need for, and measure performance and impact of food fortification. UEMOA and ECOWAS fortification standards (Table 2) align with WHO food fortification (2006)⁶ and wheat flour and maize flour fortification (2009)³ guidelines, which provide evidence-informed recommendations on setting beneficial and safe standards.⁷

Micronutrient deficiency prevalence and food consumption data have informed food fortification vehicle and micronutrient selection as well as fortification levels. Industry and regulatory body capacity assessments across the region were used to identify equipment and human resource gaps. Ongoing regulatory monitoring has been critical to quality and performance measurement, while coverage surveying demonstrates scale and facilitates decisions on vehicle and micronutrient selection. Additionally, there are increasing experience and opportunities with integration of fortification data into micronutrient surveillance platforms and health management information systems to further inform food fortification priorities and communicate fortification performance.

The virtues of patience and practicality

Given the number of stakeholders, across multiple sectors in widely different country contexts, with different priorities and paces of action, it is necessary to be patient and practical when launching and scaling up food fortification. Wheat flour and vegetable oil were prioritized, in part, because these industries tend to be centralized and large-scale, making monitoring of

performance and quality more feasible and significant scale and population coverage more attainable.

Moreover, fortification relies on both the private sector to produce high-quality fortified foods under safe and hygienic conditions and the government to ensure a fair business environment by enforcing national regulations among all producers.⁸ Small-scale producers do not always have the available capital to purchase premix or invest in fortification equipment, and monitoring food safety among thousands or tens of thousands of small units – as is the case with salt iodization and maize fortification – becomes especially challenging, particularly when fortification is being initiated.

Regional political will complemented by national-level action

Regional bodies catalyzed a supportive environment for fortification in West Africa, prompting country-level action. The political will and commitment of regional health and economic bodies and regional industry associations have been critical to launching food fortification across West Africa. Through the leadership shown by these bodies, national governments abided by resolutions and recommendations to initiate and mandate food fortification.

Important as the regional leadership has been, it is not a substitute for country-level action. Multiple ministries have coordinated efforts to fund, implement, and monitor food fortification. Fortification alliances have convened multiple sectors, and industries have accepted the risk of changing their food products and production practices. Without cooperation and coordination at the national level, fortification would not have progressed as far as it has.

Clear roles and responsibilities

Clarified roles and responsibilities and coordinated efforts in enforcing compliance with standards is needed at the national level. Many agencies are involved in quality control management, inspection, compliance and control. These include food safety, customs, standard-setting bodies, food and drug control, and the industry itself. However, roles and responsibilities among the numerous agencies are not clear in all countries, nor is there always a single authority responsible for overall management. This is needed at the country level and is especially important once fortification has been launched and the intensity of the broad partner engagement wanes. The UEMOA and ECOWAS Commissions have both voiced their support for this.

Legislation is only the beginning

There is the risk that once fortification is legislated, donors, partners and governments may consider the work to be complete. However, fortification is a dynamic process that requires

continuous monitoring and reassessment to ensure that it continually meets population needs. It is important to measure coverage and consumption to verify that there is not only enough fortified food for the population but that the food is also reaching and being consumed by the population.

Over time, countries must eventually assess the added value and feasibility of other potential fortification vehicles, micronutrients and technologies. While initial efforts have focused on wheat flour and vegetable oil, many countries assessed rice, bouillon, sugar and maize flour consumption in FRAT and FACT surveys and voluntary fortification of these commodities already exists in some countries (and is mandated in others). Countries with more mature fortification programs (7–10 years) are starting to reassess whether current vehicles, with current micronutrients at current levels, utilizing current technologies, are meeting the needs of their population, given changes in consumption patterns, micronutrient deficiency prevalence rates and dietary and demographic transitions. This requires ongoing, data-informed, multisectoral engagement of fortification stakeholders, and speaks to the importance of fortification alliances as platforms and of fortification and nutrition information systems as data sources to inform decisions.

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