Legislative Policy, Regulatory and Institutional Framework in Relations to Implementation of Large-Scale Food Fortification in West Africa: Compliance at National and Regional Level

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Disclaimer

This report is based on research funded by the Bill &Melinda Gates Foundation. The findings and conclusions contained within are those of the authors and do not necessarily reflect positions or policies of the Bill & Melinda Gates Foundation.

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LIST OF ABBREVIATION

AAS	Atomic Absorption Spectroscopy
ABNORM	Agency Burkinabè de Normalisation, de Métrologie et de la Qualité
ABSSA	Agence Béninoise de Sécurité Sanitaire des Aliments
AfCFTA	Africa Free Trade Agreement
AIFO-UEMOA	Association des Industrielles de la Filière Oléagineuse
AIM	Association des Industries Meunières
ANM	Agence Nationale de Normalisation
ARSO	Africa Organisation for Standardisation
ASN	Association Sénégalaise de Normalisation
ASN	Association Sénégalaise de Normalisation
BMGF	Bill & Melinda Gates Foundation
CA	Competent Authority
COA	Certificate of Analysis
CORDINORM	Cote D'Ivoire Normalization Agency
CRS	Catholic Relief Services
ECOSHAM	ECOWAS Harmonisation Model
ECOWAS	Economic Community of West African States
FAO	Food and Agriculture Organization
FDA	Food and Drugs Authority
FFI	Food Fortification Initiative
FSQA	Food Safety and Quality Authority
GAIN	Global Alliance for Improved Nutrition
GDP	Gross Domestic Product
GSA	Ghana Standard Authority
Helen Keller Intl	Helen Keller International

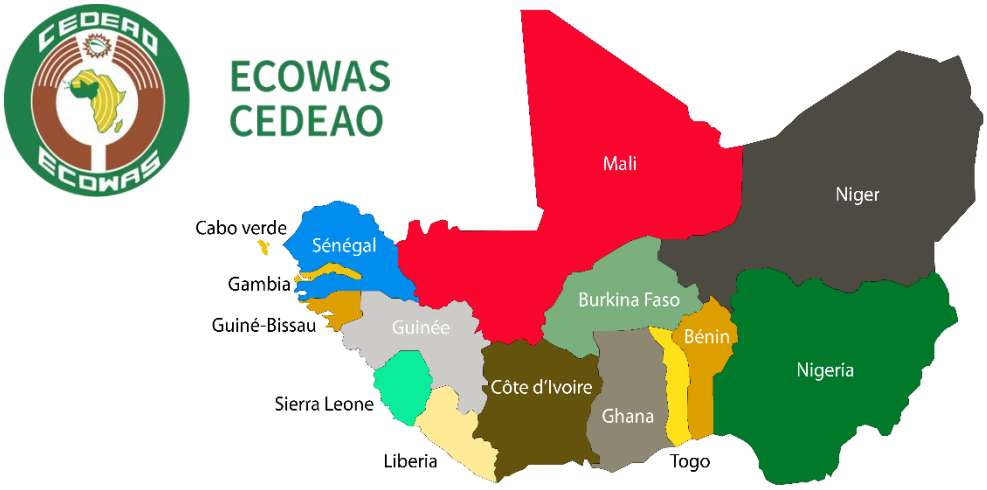
HPLC	High-Performance Liquid Chromatography
IDD	Iodine Deficiency Disorders
IMMPaCt	International Micronutrient Malnutrition Prevention and Control
IR	Infrared
ISO	International Organization for Standardization
KNUST	Kwame Nkrumah University of Science and Technology
LNSP	Laboratoire National de Sante Publique
LSFF	Large Scale Food Fortification
MAEP	Ministère de l'Agriculture, de l'Elevage et de la Pêche
MI	Micronutrient Initiative
MNP	Micronutrient Powder
NAFDAC	National Agency for Food and Drug Administration and Control
NaNA	National Nutrition Agency
NFA	National Fortification Alliance
NIR	Near Infrared
RTK	Rapid Test Kit
SON	Standard Organisation of Nigeria
TGSB	The Gambia Standard Bureau
UEMOA	Union Economique et Monétaire Ouest Africaine
UNICEF	United Nations International Children's Emergency Fund
USI	Universal Salt Iodation
UV	Ultraviolet
WAHO	West African Health Organization
WHO	World Health Organisation
WTO	World Trade Organization

EXECUTIVE SUMMARY

The Catholic Relief Services (CRS), with funding from the Bill & Melinda Gates Foundation (BMGF), is implementing a Large-Scale Food Fortification Project in West Africa. In line with this, the project commissioned a consultant to conduct a baseline study on the enabling environment for regulatory compliance for Large-Scale Food Fortification (LSFF) in the region. Specifically, the consultant was to *review the policy, legal and regulatory framework across member states, asses the capacity of public sector institutions to develop standards, enact regulations and enforce these regulations and examine initiatives by ECOWAS/WAHO to harmonisation of fortification standards in the region.*

Summary of methodology

Primary information was gathered through a structured interview of key stakeholders in seven (7) member states namely Benin, Burkina Faso, Cote d'Ivoire, Gambia, Ghana, Nigeria, and Senegal. Staff of the ECOWAS Commission was also interviewed during the mission in Nigeria. Secondary information was collected through literature review of online documents as well as documents received from contacts in the region including CRS project offices.



General Observations.

1. ECOWAS has adopted, ratified, and published standards for fortified wheat flour, vegetable oil, and iodized salt as harmonised regional standards. These standards have been adopted by all UEMOA countries, The Gambia, Guinea, and Cape Verde.
    a. Ghana is aligned to the iodized salt standard but not standard for fortified Wheat Flour and vegetable oil.
    b. Sierra Leone standard for fortified Wheat Flour is also not aligned.

c. None of the Nigeria standards is aligned with ECOWAS standards.

d. Liberia standards for vegetable oil and Wheat Flour are not aligned.

2. All member states have mandatory regulations for the enforcement of fortified Wheat Flour, Vegetable oil and iodized salt.

    a. Nigeria regulations cover mandatory fortification of corn flour, sugar, and margarine.

3. All member states have institutions legally mandated to set or promulgate standards and enforcement of legislations on food safety including LSFF.

    a. The capacity of enforcement agencies to execute their mandates is very weak in some countries. Most countries conduct factory inspection and market monitoring. These activities are, however, not supported with laboratory results on compliance except for Nigeria where the system could be attributed to on-going donor support. The Ghana FDA and FSQA in The Gambia also have a good presence at the major ports of entry. Again, their activities are not supported with verified evidence of compliance.

    b. Inspections and monitoring programmes established during donor-funded project periods are too cumbersome and expensive for national regulatory agencies to sustain.

4. Laboratory capacity within the region is highly diverse but not harmonised. Within each country could be found suitable laboratory equipment such as HPLC and AAS either with the regulator or another state agency. The use of these facilities for micronutrient analysis in support of food fortification enforcement is low for several reasons including cost, funding for consumables, human capacity (competence) among others. Countries that had used RTKs such as iCheck, Iron spots test, WYD for iodine find this suitable for enforcement.

5. A few countries have a good presence at the ports of entry. FDA in Ghana and FSQA of The Gambia have structures and presence that is well collaborated with customs at the ports of entry. The Ministry of Agriculture in Burkina Faso also has a working regulatory presence at the land borders to monitor importation of iodised salt. The case is different in Nigeria whereas a national policy, the regulators are not allowed operational presence at the ports of entry.

Results and recommendations will guide the development of the second phase of the LSFF project.

Recommendations

The following recommendations are proposed to guide CRS, WAHO and partners in their project design and implementation during follow-on phases:

1. Commission a baseline survey to establish industry compliance to the regulations of mandatory standards using market sampling and testing in each country. The BMGF is working on a protocol for a quick feedback loop survey in Nigeria that could be adopted/adapted for this survey in other countries in West Africa.

2. Commission a harmonised capacity-building strategy for all regulatory agencies on external Quality Assurance and data management with the possibility of using e-platforms. CRS is undertaking initial capacity building of regulatory institutions in Burkina Faso that could be scaled in subsequent phases.

3. Support ECOWAS to continue standard harmonisation processes and adoption among member states to promote an economy of scale and promote regional market penetration and compliance with fortified food.

4. Review voluntary fortification activities in the region led by the private sector to expand food vehicles under mandatory LSFF. Review voluntary fortification activities in the region being led by the private sector to expand food vehicles and condiments such as bouillon cubes, rice, and maize flour fortification and how these complement current vehicles under mandatory standards for fortifying specific food vehicles (salt, wheat flour and vegetable oil) LSFF.

5. Conduct a comprehensive laboratory mapping and audit across the region and create an e-catalogue of testing and analysis capacities across the region.

6. CRS and BMGF could invest in research into rapid test kits (RTKs) and reinforce digitalized analytical monitoring and tracking systems to improve compliance with mandatory standards on LSFF.

Conclusion

West Africa has made significant progress on harmonized mandatory standards on the levels of iron in wheat flour (60-ppm), folic acid in wheat flour (2.6ppm), vitamin A in vegetable oil (11-24ppm) and iodine in salt (15-45ppm) in most countries. These levels have been adopted by all Francophone countries and some Anglophone and Portuguese-speaking countries. There are however some variations in the inclusion of other micronutrients in wheat flour being fortified under mandatory standards and regulations in some countries in West Africa. There are some gaps in arriving at a fully harmonised standards as well as enforcement of regulations at the national levels. ECOWAS needs support to ensure a fully aligned harmonised standard that would achieve nutritional and sub-regional trade impacts of food fortification. This will further ensure that these are adopted and enforced at the regional level and by member states. Again, having a unified capacity reinforcement programme for regulatory agencies and micronutrient analytical

laboratories will result in equivalence in testing and enforcement across the region. The introduction of an Electronic digital platform on compliance enforcement will serve as a big push for transparency among stakeholders at the national level and across the region. Harmonized regulations and transparent information sharing through a digitalized system will yield the benefits of relevant data to be tracked by industry and governments, not just for trade but also for levels of micronutrients in fortified food in the region.

1.0- INTRODUCTION

CRS is implementing a Food Fortification project in West Africa with an initial focus on Burkina Faso. The project is being funded by the Bill & Melinda Gates Foundation. The main objective of the project is to expand and improve LSFF in West Africa to close the micronutrient deficiency gap for women, girls, and vulnerable population in the region. The project is designed specifically to:

- Identify existing capacity gaps to advance and support LSFF in West Africa generally and Burkina Faso specifically.
- Support WAHO's capacity to undertake a preliminary assessment of the status of national food fortification alliances in West Africa to better understand their functionality and institutionalisation processes, and
- Address certain shortcomings by ensuring sustainable development of public sector institutions for the application of policies and mandatory legislative instruments for compliance with regulatory standards on food fortification with micronutrients in West Africa.

One cardinal base information for the design and implementation of any Large-Scale Food Fortification project is the enabling environment for the enforcement of compliance to standards; the state of policy, legal and regulatory framework as well as the institutional arrangements and capacities at both public and private sector levels that provides effective and sustainable coordination among public and private sector stakeholders in countries and the region. These systems are very necessary for ensuring product compliance quality and safety, sustainability of the project and to promote intra-regional trade in fortified food commodities across West Africa. Efforts by continental governments to promote intra-regional trade with structures such as Africa Continental Free Trade Agreement (AfCFTA) call for harmonisation of regulations and enforcement across the continent. To this end, the project is thus looking at the harmonisation of standards and regulations within the region as a priority deliverable. Harmonized standards will promote access to fortified food trade and access by countries that have limited or no industries while advancing bigger market space for industries to comply. West Africa also has a harmonized logo for branding fortified foods by several Francophone and Anglophone countries. This initial evaluation and assessment of the

enabling environment for compliance with standards enforcement is very key to drawing up project activities and developing implementation strategies.

The evaluation is aimed at identifying gaps and statutes of the policy, legal and regulatory framework as well as institutional arrangements of key public and private sector institutions at national and regional levels in the enforcement of standards and advancing enabling environment for fortification. The evaluation also reviewed the possibility of adopting electronic platforms for quality control and information dissemination among stakeholders in the industry It also sought to identify existing strength, weaknesses, opportunities, and threats to improving the enabling regulatory environment at the national and regional level on food fortification. The findings outcome will serve will inform the second phase of the BBMGF-funded food fortification initiative to be jointly supported by the German Development Corporation (GIZ) in addressing gaps in sustainable and effective policy and regulatory environment for standard compliance to food fortification in West Africa as a baseline for project design planning and implementation.

The project will require baseline information on the current policy, legal, regulatory, and institutional landscape of member states. This therefore called for the engagement of the services of an international consultant as per the scope of work in appendix 1.

2.0- METHODOLOGY

Primary information was gathered through a structured interview of key stakeholders in seven (7) member states namely Benin, Burkina Faso, Cote d'Ivoire, Gambia, Ghana, Nigeria, and Senegal. Staff of the ECOWAS Commission were also interviewed during the mission in Nigeria. Secondary information was collected through a literature review of online documents as well as documents received from contacts in the region including CRS project offices. See **Appendix 3** for a list of institutions visited and interviewed in each country.

The consultants conducted a desk study of reports, documents, and other relevant materials on the implementation of LSFF programmes in the region. **Appendix 4** has a list of documents consulted. This was followed by stakeholder analysis and mapping within each country. A structured checklist was then developed targeting each group of stakeholders along the value chain. The checklist was developed using a modified version of the WHO/FAO national food system assessment tool. See Fig 1 below for the main tool. The tool provides a structured approach to reviewing the enabling environment for food control systems. The tool has four dimensions and nine subdimensions.

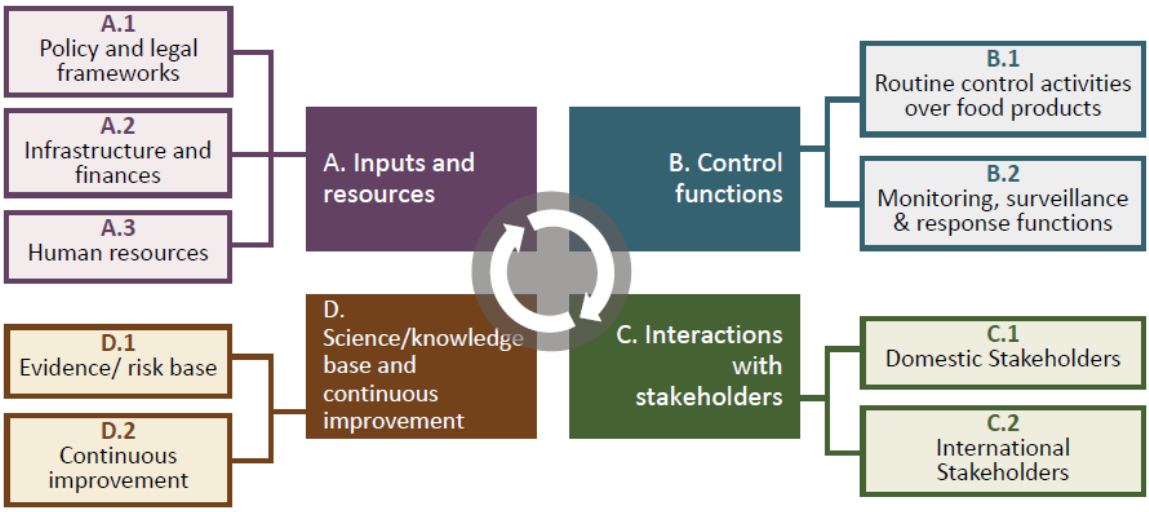


Figure 1: The WHO/FAO national food system assessment tool

Source: WHO/FAO Food Control System Assessment Tool 2021

The four dimensions seek to evaluate the inputs required for a food control system, the functionality of the system, how the system interacts with its stakeholders and how innovation and scientific knowledge is adopted for continuous improvement of the system.

The tool was adapted to focus on elements of control of LSFF and not the entire food control and regulatory system. The focus institutions are the nutrition policy standard setting and the regulatory enforcement agencies.

The checklist was then sent to the identified stakeholders in each country for completion and submission. Where necessary CRS teams well trained in the guide to support information gathering at country levels. The consultant then made follow-ups to substantiate the information provided by respondents through in-person visits and online interviews. The list of stakeholders interviewed is shown in **Appendix 3.** Expert knowledge was also solicited in some countries for institutional memory and alternative view on the issues besides that of government and industry.

3.0- GENERAL FINDINGS AND OBSERVATIONS

3.1- Review of Literature

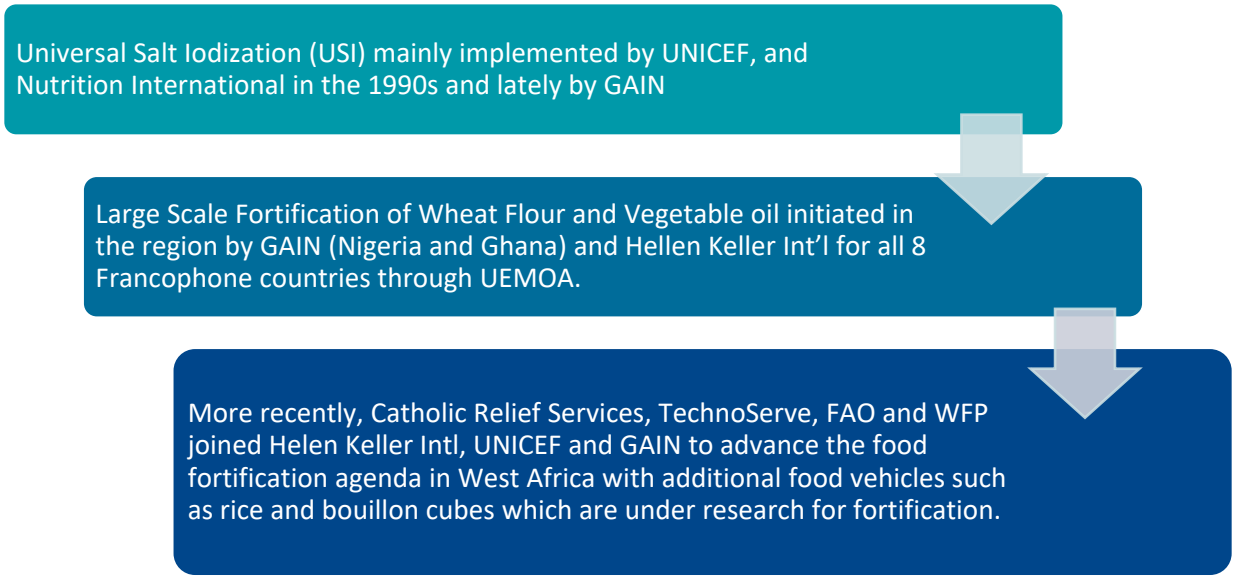
The socioeconomic burden of micronutrient deficiency on the economies of West African countries is overwhelming. Annual economic losses associated with iron, vitamin A and iodine deficiencies are estimated at 2-5% of GDP (Stein AJ et Qaim M, 2007; World Bank, 2007). According to the 2022, Global Nutrition Report, one out of three children are estimated to be stunted in the West Africa sub-region and over 15% of children are born with low birth weight coupled with potential birth defects, such as neural tube defects resulting from folate deficiency. Different forms of vitamin and mineral deficiencies are major factors in the economic setback of all the countries in the West Africa sub-region, notably vitamin A, iron, iodine, folate, and zinc deficiencies. These deficiencies result in very high levels of infant and maternal morbidity and mortality, reduced work capacity, compromised immune systems and intellectual capacity, and impaired physical growth and development.

Different forms of vitamin and mineral deficiencies are major factors in the economic setback of all the countries in the West Africa sub-region, notably vitamin A, iron, iodine, folate, and zinc deficiencies.

Generally, diets in West Africa are monotonous and lack adequate diversity to improve micronutrient intake. This has been worsened by the Covid-19 pandemic, climate change, fuel and food price increases being affected by conflict. Most citizens in both the formal and informal sectors have experienced dwindling incomes; the percentage of income spent on food has increased, while dietary diversity decreased. Women are affected to a greater extent because they require higher levels of micronutrient intake but have lower capacity on average to afford nutritionally adequate food. An estimated 14.7% of the total West African population of 402 million people are undernourished. Only 22% of children under two receive the minimum dietary diversity, potentially mirrored by the dietary diversity among women caregivers who are not able to meet their minimum dietary diversity scores in the region. The regional intake of key foods and nutrients in adults aged 20 years and over compared against minimum and maximum values are below targets for fruits, vegetables, legumes, and other micronutrient-dense foods. Only four out of 15 countries – Benin, Ghana, Nigeria, and Sierra Leone - have developed food-based dietary guidelines.

Food fortification is an important element in nutrition strategies to alleviate micronutrient deficiencies in selected populations. Food fortification must, however, be controlled through the development of appropriate regulations and legislation. Adherence to the legislation will ensure that the objectives of the food-fortification program are achieved and that the levels of micro-nutrients are controlled within standard requirements for impact.

Large Scale Food fortification in the region can be depicted in three different programmes:



Nigeria is the first country in the region to enact a law to mandate USI in 1992. This was followed by Ghana and Mali in 1996. Nigeria again mandated the fortification of wheat flour, vegetable oils, sugar, and maize flour by 2002.

In 2006, after observing that only Nigeria had mandatory fortification regulations and the persistent high burden of micronutrient deficiencies, the Ordinary Assembly of Health Ministers of ECOWAS countries, held in Abuja, Nigeria, adopted resolutions recommending countries to adopt mandatory fortification of all wheat flour and vegetable oil and to classify food as a basic commodity (ECOWAS, 2006; ECOWAS, 2008). Based on various fortification rapid assessment tool (FRAT) studies and the resolutions passed, there were various public-private partnership dialogues held by the ECOWAS member countries in Accra, Ghana (2002) and in Bamako, Mali (2008). Helen Keller Intl advocated for the vegetable oil industry association of the Economic Monetary Union (AIFO-UEMOA) to consider vitamin A fortification of vegetable oil as a win-win advantage of improving consumer health and expanding regional market access through mandatory standards with an economy of scale for local production of vitamin A fortified vegetable oil. Under the *Fair Tache d'Huile en Afrique de l'Ouest* regional initiative for fortifying vegetable oil with vitamin A, funded by USAID, Helen Keller Intl signed a memorandum of understanding among stakeholders and with the UEMOA Commission to advance the food fortification agenda and later expanded the regional initiative to include wheat flour fortification under the Fortify West Africa initiative with the creation of the flour milling industry association.

The fortification initiatives at the national and regional levels were largely and jointly funded by BMGF through GAIN, USAID, Michael and Suzan Dell Foundation, Taiwan Government, UNICEF, Nutrition International and Helen Keller Intl as well as the private

sector industries that adhered to fortifying their food products. The UEMOA and ECOWAS

Commissions initiated the mandatory standards and harmonisation mechanisms for LSFF in the region.

In 2014, vegetable oil, wheat flour and salt were formally introduced into the ECOWAS Harmonization Model (ECOSHAM) process.

During numerous technical meetings, current fortification standards for these commodities were developed, reviewed, adopted and ratified under mandatory legislative harmonized standards for compliance enforcement in most countries of West Africa. Following public review in each country, the standards were revised, and a formal ECOWAS standard was 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 process, countries are now obliged to modify their legal frameworks (laws, decrees, etc.) to incorporate the new standard.

In December 2015, upon validation by the Ministers in charge of Industry, the Council of Ministers for African Integration adopted the ECOSTAND008 standard: 2014 with Regulation C/REG.32/12/15. Regarding the fortification standards for soft wheat flour (ECOSTAND 47: 2015), they were adopted in May 2016 with regulation C/REG.7/05/16, by the Statutory Council of Ministers for African Integration.

Helen Keller Intl, in a 2022 report, indicated that it had partnered with the Global Alliance for Improved Nutrition (GAIN), Nutrition International (formerly Micronutrient Initiative), UNICEF and the private sector, with a commitment to support individual countries to speed up:

- Universal salt iodization
- Fortification of refined vegetable oils with vitamin A
- Fortification of wheat flour with vitamins and minerals; in particular folic acid and iron.

The current review of the enabling environment for compliance enforcement and application of mandatory standards at the regional level will prioritize some selected countries such as Benin, Burkina Faso, Côte d'Ivoire, Ghana, Nigeria and Senegal in West Africa.

Table 1: Status of food fortification in West Africa

	Country	*Wheat Flour*	*Vegetable oil*	*Salt*	*Sugar*	*Rice*
1	Benin	Mandatory (2012)	Mandatory (2012)	Mandatory (2013)		
2	Burkina Faso	Mandatory (2012)	Mandatory (2012)	Mandatory (2013)		
3	Cote D'Ivoire	Mandatory (2007)	Mandatory (2007)	Mandatory (1996)		
4	Cape Verde	Mandatory (2014)	Mandatory (2014)	Mandatory (2004)		
5	The Gambia	Mandatory (2010)	Mandatory (2010)	Mandatory (2005)		
6	Ghana	Mandatory (2010)	Mandatory (2010)	Mandatory (1996)		
7	Guinea	Mandatory (2013)	Mandatory (2013)	Mandatory (2001)		
8	Guinea Bissau	Mandatory (2014)	Mandatory (2014)	Mandatory (2004)		
9	Libera	Mandatory (2017)	Mandatory (2017)	Mandatory (2014)	Mandatory (2014)	
10	Mali	Mandatory (2010)	Mandatory (2010)	Mandatory (1999)		
11	Niger	Mandatory (2010)	Mandatory (2010)	Mandatory (2014)		
12	Nigeria	Mandatory (2002)	Mandatory (2002)	Mandatory (1993)	Mandatory (2002)	
13	Senegal	Mandatory (2009)	Mandatory (2009)	Mandatory (2000)		
14	Sierra Leone	Mandatory (2011)	Mandatory (2011)	Mandatory		
15	Togo	Mandatory (2012)	Mandatory (2012)	Mandatory		

With the publication of fortification standards for wheat flour, vegetable oil and iodized salt by ECOWAS, all UEMOA countries adopted these as their national standard in line with ECOWAS agreements. Non-UEMOA countries such as The Gambia, Liberia and Cape Verde also aligned with the adopted ECOWAS standards.

Ghana, Nigeria, and Sierra Leone are yet to align their standards to the regional standards. Ghana has already aligned its iodized salt standard. Nigeria, for instance, believes that the ECOWAS standards will also have to be reviewed considering that Ghana, Sierra Leone, and Nigeria may have good reasons to keep their specification as they currently are. This line of thinking is in tune with recommendations made by Tidiane Traore (2008) suggesting that the UEMOA standards (then ECOWAS standards had not been published) should consider including the B vitamins as a replacement for losses during wheat milling while Ghana and Nigeria take out Vitamin A from their wheat flour standard in favour of increasing the levels in vegetable oil beside considering using other vehicles for Vitamin A, which is a fat-soluble vitamin and potentially reduces the shelf life of wheat flour while best absorbed when added to vegetable oil.

3.2- Assessment of Regulatory Compliance

This section has three components: A general overview of the region, individual country analysis for countries that were visited by the consultants or countries that responded to the questionnaire, and regional initiatives (ECOWAS and Development partners) on LSFF.

The report structure is based on the FAO/WHO food control system assessment tool that guided the interview process. It considers the Inputs and resources needed to drive a food control system, the control functions of competent authorities (CA) and the relationship between CAs and stakeholders. Gaps and recommendations are highlighted per each dimension of assessment and at each country level.

A- General Overview of the Enabling Environment for Regional Standards on Food Fortification

A. Inputs and Outputs

A1: Policy and Legal Framework

Available literature and evidence from countries visited indicate that all member states of ECOWAS have a policy to address micronutrient malnutrition through different strategies. One of these strategies is Large-Scale Food Fortification (LSFF). With support from UNICEF and Micronutrient Initiative (MI), member states initiated policies and programmes to address Iodine Deficiency Disorders (IDD) through the Universal Salt Iodisation (USI) programme. The policies on USI were all imitated in the early to mid-1990s, spearheaded by Ministries of Health in all countries. The period after the year 2000 saw the expansion of these policies to include micronutrient fortification of Wheat Flour

and cooking/vegetable oils to address vitamin A, iron, and folate deficiencies among other micronutrients.

Within the period of 1992 and 2000, all member states had enacted laws that mandate the fortification of salt for human and animal consumption with iodine using Potassium Iodate. Most of these laws have since been either repealed or amended to include fortification of other food vehicles especially wheat flour and vegetable oil but also sugar, corn flour and margarine for Nigeria. For instance, the Public Health Act 850 (2012) repealed the Food and Drugs Amended Act 305 (2006) and Ministerial Directive on the fortification of wheat flour and vegetable oil in Ghana. Again, in The Gambia, the Food Fortification Regulations 2005 was repealed with the enactment of the Food Fortification Regulations, 2020.

After the recent revisions in regulations, all member states except Ghana and Nigeria had aligned their standards for fortified Wheat Flour, Cooking oil and salt to the ECOWAS standard for these products. Whiles the ECOWAS standard for fortified Wheat Flour mandates the addition of Iron and Folic Acid at 60ppm (FF/FS-forms) and 2.6 ppm respectively (established based on the 2008 WHO recommendations for wheat flour

"There is the need to harmonize standards and enforcement framework within the region. ECOWAS commission is rightly positioned to facilitate the process of harmonization and adoption of harmonized standards by member states. Technical and administrative structures already exist within the ECOWAS Commission for this purpose. The CRS project may consider supporting ECOWAS in this direction in partnership with other stakeholders."

fortification with micronutrients based on per-capita wheat flour consumption and various forms of micronutrients to be added), the Ghana standard GS 812:2016 and Nigeria standard NIS 121:2014 included Vitamin A, Zinc and a couple of the B-group vitamins. It is also worth noting that besides the difference in the number of micronutrients specified in these standards, the levels of Iron and Folic Acid are also not aligned with the levels specified in the ECOWAS standards. Again, the Ghana standard GS 813:2016 and the Nigerian standards NIS 121:2014 specified 10ppm and 20ppm of vitamin A as vitamin A palmitate in oil whiles the ECOWAS standards specify 11 – 24ppm of vitamin A palmitate in fortified vegetable oil. Sierra Leonian standard for fortified wheat flour is not aligned with the ECOWAS standard and seem to align more with standard requirements for Nigeria. Liberian standard specifies a level of addition of 20ppm for Vitamin A in vegetable oil with a tolerable analytical range at factories and

borders of 17,4 – 22,6ppm, the standard for Wheat Flour has Zinc and a couple of B-group vitamins included. These standards are not aligned with the regional harmonized standard. There is therefore the possibility that though the Liberia, Sierra Leone, Ghana, and Nigeria standard for fortified wheat flour may not be fully aligned with the regional harmonized standard, it could potentially be reviewed to effectively align. Out of 15 countries, 13 of them also brand fortified wheat flour and vegetable oil with the harmonized *ENRICHI* logo, apart from Ghana and Nigeria which have separate logos for branding fortified food.

Across West Africa, wheat flour and vegetable oil were prioritized for fortification since they were consumed by large proportions of the population (over 70% of the population from FRAT surveys) at consistent daily amounts and were free of negative organoleptic changes or perceptions when fortified with micronutrients. Fortification was also determined to be feasible technically and affordable to industry and consumers. Political will existed within the public and the private sectors. Importantly, feasibility was reflected in the structure of the flour and vegetable oil industries: a centralized, limited number of large-scale producers covered most of the population's needs.

A2: Infrastructure and Finance

Two sets of Competent Authorities (CAs) have been recognised in most countries. These are:

1. Competent Authority responsible for the promulgation or establishment of mandatory national standards
2. Competent Authority responsible for enforcement of compliance to the established mandatory standard on food fortification for the domestic market.

The technical capacities of these CAs to implement mandates varies from country to country. Generally, however, CAs in charge of standard promulgation are better resourced (human and infrastructural technical capacities) and in some cases laboratory infrastructure than enforcement agencies. This may be due to their collaborations with

same institutions globally resulting in the adoption to international best practice within their industry.

Technical capacity reinforcement requirement for regulatory agencies in member states. It is important that this capacity reinforcement is properly tailored to fit into existing regulatory structures rather than introducing new systems that may not be sustained after the project exit. Harmonized training will likely lead to regional equivalence in enforcement and possibly collaboration among regulatory agencies. Again, this will be a great opportunity to initiate the discussion on electronic data management on industry and market level standard enforcement compliance.

Again, testing and analysing capacities vary among countries. While some countries such as Nigeria, Ghana, Cote d'Ivoire, and Burkina Faso have relatively well-equipped state-owned laboratories, others are lagging in equipment capacity and human resource. Even for countries that have well-resourced laboratories, reference standards are mostly not available. Also, CAs of almost all countries indicated that they were supplied with iCheck devices by different projects for use. These devices came in handy for both laboratory and field control, especially for port of entry control such as in Ghana and Burkina Faso. These devices are, however, not in use (except in Nigeria (NAFDAC and SON) and in The Gambia). The main reason was the availability of consumable vails and the sustainability of its purchase. The vials could only be sourced from the manufacturer, BioAnalyt. Again, the iCheck devices are micronutrient and vehicle specific in design. That means that different iCheck devices had to be purchased for different micronutrients. For instance, iCheck for

A. *Laboratory audits in each country*
B. *Regional catalogue of laboratories and capacities*
C. *Investment into RTKs for regulatory enforcement. Beside the existing RTKs, the KNUST in Ghana is working on a non-destructive RTK for identifying micronutrients in food. This makes use of a combination of potable NIR/UV lessor and machine learning. CRS and BMGF could invest in research into rapid test kits (RTKs) and reinforce digitalized analytical monitoring and tracking systems to improve compliance with mandatory standards on LSFF.*

determination of Vitamin A in oil cannot be used to determine Vitamin A in wheat Flour. Much as it is cheaper and easy to use relative to the traditional methods using HPLC and AAS, the challenge of acquiring the vials is a major hindrance to public sector instructions. Some public laboratories such as those in Burkina Faso, Ghana, Nigeria, and Senegal also have more sophisticated quantitative analytical equipment for micronutrient analysis such as the HPLC and AAS.

The investigators also came across ongoing research at the Kwame Nkrumah University of Science and Technology using handheld Infrared (IR) and UV technologies to identify and possibly quantify micronutrients in food products. This research could be a novel for the industry to compliment what iCheck is currently doing.

Support for regional harmonization of regulation and some form of equivalence in enforcement and mutual recognition of equivalent standards will facilitate intra-regional trade and economy of scale for industries to comply to fortification standards in West Africa

The CAs responsible for the promulgation of standards are well coordinated at the West African levels through ECOSHAM and Africa through Africa Regional Standard Organization (ARSO). There is, however, no official platform for harmonising enforcement in the region. Unofficial structures are beginning to emerge where CAs have created platforms to harmonise their activities.

Again, most countries have overlaps between market authorisation and conformity assessment. While it is generally accepted that conformity assessment is a voluntary action, there is usually a double burden on the industry to comply with both regulations.

A functional NFA has been useful in Nigeria to addressing these issues. Even though scenarios may differ, round table discussion at NFA meetings could be a useful tool to addressing. It brings about efficient use of resources whiles taking out the double burden of regulatory compliance by food business operators (local fortified food producers and importers).

Most regulatory activities under LSFF are donor-financed through the project. These include capacity building, equipment sourcing and even private sector development. The challenge is that most of these projects do not have a proper exit strategy that ensures sustainability. Again, the projects come with cumbersome regulatory enforcement and monitoring strategies that are usually not sustainable under regular government budgets

CRS sustainability study and strategy for member countries to have inspections and monitoring programs that can easily be undertaken within the regular framework of enforcement. The Bill & Melinda Gates Foundation is currently working on a simplified market monitoring program. This could be studied and adopted.

or prioritized for compliance enforcement. Whiles the initial phases of a project will require frequent industry inspections and market monitoring, a risk-based approach should be adopted to simplify these processes to make them sustainable post-donor funding.

A3: Human Resources

The different projects that support LSFF, developed a capacity-building material for both private and public sector institutions to strengthen capacity towards food fortification. Quality Assurance manuals were developed, and stakeholders were trained on both internal quality assurance for the private sector and external Quality Assurance for public sector institutions. Evidence from countries visited indicates that good capacity still exists. Refresher capacity will, however, be very useful for member states, specifically talking about harmonisation of regulations and enforcement within the region. Regional and national level capacity development could be prioritized as part of a continuous process for effective food fortification standard compliance enforcement.

Review of existing manual and refresher trainings

B. Control Functions

B1 & 2: Domestic control, monitoring and surveillance

Some countries have annual plans for inspections and market monitoring which includes fortified products among other products under the purview of the regulators. It is only Nigeria that has a specific structured system dedicated to LSFF. This is supported by TechnoServe and GAIN. Information is hardly available to assess the level of compliance in different countries except Nigeria. Inspections at factories are a regular function of CAs. In Ghana, for instance, verification of compliance is done using a mass balance of premix usage against products produced and sold. Sampling, testing and analysis are not regular features and are not reported because of testing capacity and turnaround time. Port of

entry activities are usually joint efforts between customs and the regulators. In Burkina Faso for example, the Ministry of Agriculture is effective with salt monitoring at major ports of entry. Monitoring of other products is, however, very weak due to the absence of Rapid Test Kits (RTKs). The national laboratory, which is now mandated with enforcement lacks the capacity to be universally present at the ports, factories, and market. In Nigeria, the NFA had managed to split enforcement between SON and NAFDAC to avoid duplication of functions. SON is responsible for factory inspections whiles NAFDAC takes on the market. Both CAs are, however, not allowed to operate at the major ports of entry. Ghana and The Gambia have a system where the Food and Drugs Authority (FDA) and FSQA have a presence at ports, markets, and factories. Again, the absence of RTKs and overstretched central laboratory strongly impacts the ability of the FDA to conduct regular testing and analysis. Records are generally not available to assess compliance.

Despite their different names in different countries, the National Food Fortification Alliance (NFA) are set up in most ECOWAS member states. The NFA was implemented in Burkina Faso in 2002, in Mali in 2003, in Nigeria in 2007, in Côte d'Ivoire and Senegal in 2006. In Niger, there is no National Alliance on Food Fortification. However, there is a national committee on food fortification established in 2003, under the leadership of the Nutrition Directorate. It is expected that this committee will transform into an Alliance by a decree that will validate the legal form.

Nigeria, The Gambia, and Burkina Faso have functional NFAs at which regulators are compelled to present reports for stakeholders' validation and knowledge. The National Alliances report to the Ministry of Health in Burkina Faso, Côte d'Ivoire, and Mali. The National Fortification Alliances of Nigeria and Senegal report to the Ministry in charge of Industry.

Although the NFFA or NFA has its institutional framework in the ministries in charge of health or industry, it has representations from technical bodies in charge of quality control, inspection, standardization, customs, communication, technical education, scientific research centers, international NGOs, technical and financial partners, and the consumers associations.

1. *Different countries have adopted different approaches to enforcement. For instance, while all enforcement in Ghana and The Gambia is under the purview of FDA and FSQA respectively, Nigeria has SON responsible for factory level enforcement whiles NAFDAC does market monitoring. Burkina Faso has the agriculture department doing a good job for salt monitoring at the ports of entry. Recommending a single structure and approach for all countries might not be necessary. Countries can be introduced to best practice but guided to adopt and adapt a structure that will best suite their environment and stakeholders.*

2. *In addition to reactivating NFA with a sustainability plan, CRS may also consider the introduction of electronic platform for information sharing to partner on regulatory compliance. FORTIMAS is a brilliant tool for compliance data collection. It is, however, a bit too comprehensive and demanding for competent authorities to integrate into their regulatory system considering vastness of their mandates. FORTIMAS should be contextualized and simplified to make it adoptable within current enforcement structures of competent authorities.*

Most of the NFAs in the countries are non-functional, owing largely to lack of funding for activities. Apart from Senegal, where the government provides grants for their activities, most of the other do not have any funding from government. As such, the activities of the NFAs are still donor funded, such as in Burkina Faso, where the alliance has been revived through financial and technical support from CRS.

A. Stakeholders' engagement

C1: Domestic stakeholders

International best practice for the promulgation of standards and enactments of legislations requires stakeholders' involvement and consultations. Available documents indicates that for all countries, there is a Technical Committee (TC) for food, and it is this committee that drafts the standards for fortified food vehicles and the vitamin premix thereof. These TCs are multi-sectorial in nature and includes stakeholders from both the private and public sector. Interesting to note also is that the initiative to develop standard for fortified vehicles are muted by the NAFF within the country. The NAFF is also

extensively involved with the stakeholder consultation for both the standards and regulations.

C2: External stakeholders' engagement to advance compliance enforcement.

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 Hellen Keller Int'l, UNICEF, Nutrition International (formerly Micronutrient Initiative, MI), 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.

The standard setting CAs of all member countries are members of ECOSHAM, ARSO and CODEX. They actively particate in activities if these institutions are mostly aligned with regulations from these stakeholders. The French speaking block of ECOWAS, UEMOA also organises active meetings for members and are strongly involved in issues around LSFF.

B- Regional Initiatives

In consideration of the public health and development challenges posed by micronutrient deficiency in the region, ECOWAS in 1994 issues a directive for Universal Salt Iodization to combat the effect of iodine deficiency in the region. Again, at the seventh Assembly of health ministers of ECOWAS in 2006, leadership resolved to advance mandatory fortification of Wheat Flour and Vegetable oil with micronutrients of public health interest. These leadership moves led to a massive transformation of the nutritional landscape in the region. Development partners moved in to support countries in the region with funds and technical assistance to implement projects and programmes on LSFF.

The UEMOA block under the support of a Hellen Keller Int'l Fortify West Africa project drafted a harmonised standard for fortified Wheat Flour and Vegetable oil. The block also came up with a prototype legislation to be adopted by members. The UEMOA sub-region adopted the standards across all countries and came up with a harmonized regional logo *ENRICHI for branding fortified foods* with associated social marketing and communication campaigns at the national and regional levels to drive awareness and sensitization on LSFF in the region. Whiles Hellen Keller Int'l was working with the UEMOA sub-region the Global Alliance for Improved Nutrition had developed support for some of the English-speaking member states, specifically Ghana and Nigeria, funding national programs on food fortification while also providing funding support to some Francophone countries through Hellen Keller Int'l to Cote d'Ivoire and Mali to advance fortification at the national level.

The Professional Association of Cooking Oil Industries (AIFO-UEMOA), the Professional Millers Association (AIM-UEMOA) of the West African Economic and Monetary Union (AIFO-UEMOA, now AIFO-CEDEAO and AIM-UEMOA) worked with members, mainly private companies to oversee the interest in food fortification in the region, making food fortification conditional for all members including new industries desiring to adhere and join these industry associations. AIFO-UEMOA called on its member industries to begin fortifying oil voluntarily in 2006, before any UEMOA country had mandated it. With an office in Benin, members are spread among the different countries. The association is still working actively at expanding its membership drive and support for food fortification across all countries of ECOWAS. A seemingly similar structure of the wheat flour industry started but never got fully functional, even though the milling industry association received initial support from the oil industry association. The possibility to expand AIFO-UEMOA-CEDEAO to include milling and salt-producing industries under one hegemony of industries involved in large-scale food fortification could be a potentially positive development to group all industries under one bigger umbrella of private sector association advancing food fortification in West Africa.

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; labelling as well as branding with the *ENRICHI* logo; and packaging and distribution of fortified vegetable oil, wheat flour and iodized salt.

Between 2015 and 2016, ECOWAS, through ECOSHAM developed standards for iodized salt, fortified Wheat Flour, fortified Vegetable oil and fortified sugar as regional standards aligned to the UEMOA standards. These were subsequently approved by the Council of Ministers and adapted as regional standards to be adopted by member countries.

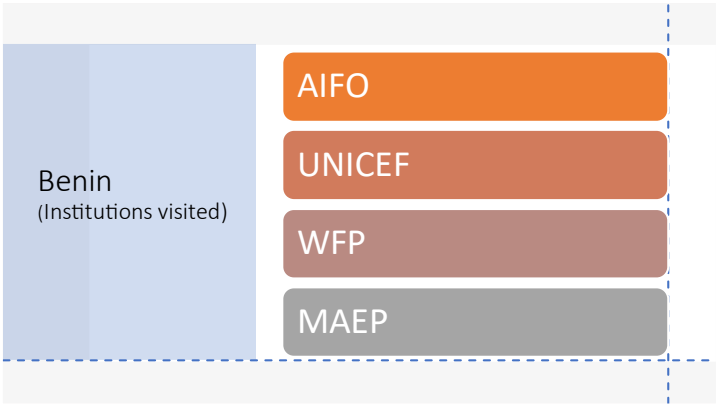
Non-UEMOA countries that had initiated fortification after the ECOWAS standards were promulgated adopted these as national standards. Currently, Nigeria, Ghana and Sierra Leone are the only countries in the region operating with some equivalence but different standards from the regional harmonized standards by including additional micronutrients in their mandatory standards as well as varying the levels of mandatory standards stipulated in the ECOWAS regional harmonized standards.

Table 2: Standard specification for wheat flour, oil, and salt in all 15 countries

	Wheat Flour									*Veg. oil*	*Salt*
	Iron	**Zinc**	**Vit A**	**Vit B1**	**Vit B2**	**Vit B3**	**Vit B6**	**Vit B9**	**Vit B12**	**Vit A**	**Iodine**
Nigeria	40 (NaFeEDTA)	50	2.0	6.0	5.0	45	6.0	2.6	0.02	20	50 factories & ports 30 at retail
Ghana	58.5±10%	28.3±10%	2.0±10%	8.4±10%	4.5±10%	59±10%	-	2.08±10%	0.01±10%	10±10%	
S. Leone	60 ±10% (Fe Fumarate) 30 (NaFeEDTA)	95±10%	-	8.4±10%	4.5±10%	59±10%	-	5±10%	0.04±10%		
Liberia	60 ferrous Fumarate 40±10% NaFeEDTA	95 Zinc oxide	-	8.5	5	59	-	2.6	0.04	20	45 Level of addition 40 – 60 Tolerable analytical range at factories and borders
UEMOA Cape Verde Guinea ECOSHAM	60 (Fumarate & Sulphate) 40 (NaFeEDTA)							2.6		11-24	

C- Situational analysis in some key member countries of ECOWAS.

Benin



Benin has mandatory regulations for salt iodization, fortified wheat flour and fortified vegetable oil. The Benin Agency for Standardization and Metrological Services and Quality Control Management (ANM) adopted the ECOWAS Standards as national standards for these products. ANM benefits from affiliations to regional and international standard organisations to perform its functions effectively.

Table 3: Standards specifications in Benin

Food vehicle	*Micronutrient*	*Prescribed levels*	*Comments*
Salt (Mandatory)	Potassium Iodate	Not less than 50ppm at production 30 -60ppm at import/export 20 – 60ppm at retail	Aligned with ECOWAS standard
Vegetable oil (Mandatory)	Vitamin A palmitate	16 – 24ppm– at production 11 – 24 ppm – In retail	
Wheat Flour (Mandatory)	Iron	Fe as Ferrous Fumarate 60 ppm +/- 10% Fe as Ferrous Sulphate 60 ppm +/-10% Fe as NaFeEDTA 40 ppm +/-10%	
	Folic Acid	2.6 ppm +/- 10%	

The mandate for enforcement is with the Beninese Food Safety Agency ***'Agence Béninoise de Sécurité Sanitaire des Aliments (ABSSA)'*** which was established in 2012 under a decree**.** This is relatively a newly created agency under the Ministry for Agriculture,

Fisheries, and Industry (MAEP). The capacity of ABSSA to conduct inspections, port of entry control and market monitoring is considered very weak among stakeholders. Previous capacity building was supported by Helen Keller Intl. Some stakeholders think that there is no enforcement of the regulations for imported vegetable oil.

Benin has some laboratory capacity within the public and private sectors including the universities. None of these laboratories was visited during the mission. Interview with stakeholders, however, indicates that there is inadequate capacity for micronutrient testing and analysis in the country.

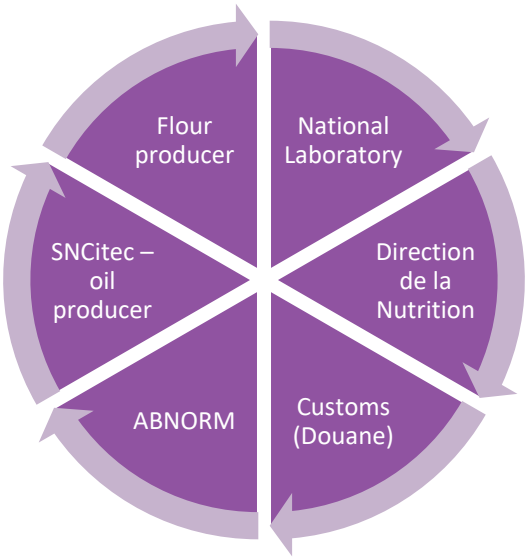
UNICEF support most and is still supporting most of the activities under USI. This includes capacity building of state institutions to support artisanal salt mining institutions, provision of fortificant to the private sector and RTKs to public sector institutions to facilitate testing and analysis during routine inspections. These RTKs are currently not in use due to inadequate funding to procure consumables.

There is no data to show the level of compliance to any of the food products covered under the LSFF. The consultant was informed of a recent report on the compliance status of vegetable oil, but this report was not available for verification.

1. *Most stakeholders are not aware of the regulatory aspects of the decree. Some major stakeholders informed the consultant during the interviews that there was no law requiring imported oil to be fortified. The decree is, however, very specific on local production and importation of salt, wheat flour and cooking oil.*
2. *Capacity of ABSSA to regulate the industry and enforce compliance is considered weak among major stakeholders and industry players. This view was highly presented by the association of oil producers, AIFO, with its headquarters in Benin.*
3. *Laboratory capacity audit is needful to identify gaps to be addressed. This should include the use of RTKs.*

WFP is also undertaking targeted fortification of some food vehicles in selected regions of the country as well as distribution of Micronutrient Powder (MNP). It is also supporting the Government school feeding programmes with fortified foods. For instance, the project ensures that fortified oil is supplied for the school feeding project.

Burkina Faso



Management at the nutrition department (Direction de la Nutrition) informed the Principal Investigators that LSFF has been a key component of the national nutrition policy since the introduction of USI in the 1990ss. Burkina Faso adopted and is working with the ECOSHAM standards for fortified Wheat Flour, cooking oil and iodized salt. *Agency Burkinabè de Normalisation, de Métrologie et de la Qualité (ABNORM)* is the State mandated agency responsible for the promulgation of standards and conformity assessment. ABNORM has adopted the ECHOSAM standards for fortified wheat flour, cooking oil and iodized salt as national standards. ABNORM is an active member of ECOSHAM, ARSO, CODEX and hosts the codex contact for the country.

The country, like all other UEMOA countries, benefited from the Helen Keller Intl project that supported all 8 UEMOA countries to achieve LSFF for wheat Flour and cooking oil under the Fortify West Africa initiative.

Table 4: Standards specifications in Burkina Faso

Food vehicle	*Micronutrient*	*Prescribed levels*	*Comments*
Salt (Mandatory)	Potassium Iodate	Not less than 50 ppm at production 30 -60 ppm at import/export 20 – 60 ppm at retail	
Vegetable oil (Mandatory)	Vitamin A palmitate	16 – 24 ppm – at production 11 – 24 ppm – In retail	Aligned with ECOWAS standard
Wheat Flour (Mandatory)	Iron	Fe Fumarate 60 ppm ±10% Fe Sulphate 60 ppm ±10% NaFeEDTA 40 ppm ±10%	
	Folic Acid	2.6 ppm ± 10%	

The National Agency for Environmental, Food, Occupational and Health Product Safety *'Agence nationale pour la sécurité sanitaire de l'environnement, de l'alimentation, du travail et des produits de santé (*ANSSEAT*)'* previously known as the National Laboratory of Public Health, *Laboratoires' National de Sante Publique* (LNSP), has the mandate to enforce the regulations enacted by a administerial decree. Until the appointment of ANSSEAT ex LNSP as the national food safety regulator, the regulatory function was a duty shared between ABNORM and the *Direction de la protection des végétaux et du conditionnement* DPVC (Directorate of plant protection and market preparation) where the latter regulates the importation of fortified products. The government took advantage of the presence of *DPVC* at the various ports of entry and establish

1. *Institutional capacity building and MOU between the regulators and customs to collaborate and share information in the food control space.*
2. *LNSP required a complete overhale of its structures to accommodate its new mandate as food safety regulator. Capacity building for LNSP to take up the function of a food regulatory agency is urgent.*
3. *Need for a national survey to determine current compliance at market/retail level.*
4. *Supply of RTKs would come handy in enforcement. iCheck devise supply should come with a sustainability plan as most countries are not able to procure reagent vials after donor funds cease.*
5. *Support for LNSP to be part of the regional and international network of food regulatory agencies. Food regulatory agencies in Africa are taking advantage of the AfCFTA common market to harmonize food control in the region. LNSP can take advantage of this and many other opportunities to expose itself to the food regulatory industry and enjoy lessons of best practice from peers.*

relationships with customs to perform this function, with a particular focus on the control of iodized salt imported into Burkina Faso. Even with the enactment of a law that transfers the mandate of food safety control for processed foods to ANSSEAT, the directorate still

does this function at the ports of entry, especially for iodized salt. Management of ANSSEAT admits that they currently do not have the capacity and resources to undertake the mandate of food control and regulatory enforcement.

The ANSSEAT has a good capacity to test and analyse some micronutrients of fortified foods. The institution received support from donors including CRS and Helen Keller Intl among others to procure laboratory equipment. They also benefited from capacity-building support by Helen Keller Intl during the fortified West Africa project. The use of RTKs comes in handy for on-field regulatory assignments. Customs has a good relationship with food control agencies. The current practice of referring food items to the regulators for clearance before release for marketing needs to be strengthened. The customs request to have their staff also trained in the food fortification regulations to strengthen the overall food control system of the country.

ANSSEAT has the responsibility for market monitoring of fortified products. This function is not done to any extent due to low capacity. There is no record of market surveillance and compliance at the market level.

Besides the LNSP, there is some laboratory capacity within the National Food Research Department to support testing and analysis.

Funding of activities of these institutions is mainly from government. Fortification has, however, been supported in the past by donor partners such as Helen Keller Intl, UNICEF and currently CRS and USAID Advancing Nutrition.

Cote D'Ivoire

Issues of LSFF are represented in the National Nutrition Policy of the Ministry of Health. It is, however, not considered a primary part of the national nutrition policy under the Ministry of Health. the policy on iodized salt is more prominent than LSFF of wheat flour and cooking oil.

Like all members of the UEMOA block, the country adopted the ECOWAS standards and pass decrees to mandate the enforcement of these standards.

The Ivorian Normalisation council which is the state agency responsible for setting standard has ceded this mandate to the Cote D'Ivoire Normalisation (CORDINORM), a private sector lead association with 40% state and 60% private interest. Côte D'Ivoire Normalization (CODINORM) this serves as the the national standard and certification agency of the country. CORDINORM is a not-for-profit body created by the private sector with the authorization of the state. The agency is responsible for standards setting as well as regulation of products. Inspection of factories and issuance of market authorization to demonstrate conformity to standards are under the purview of CODINORM. Ministry of Trade and Commence, however, handle imports in collaboration with CODINORM-accredited inspection bodies such as SGS and BIVAC.. Activities of CODINORM are financed through government support, internally generated funds (IGF) and donor partners. CODINORM is allowed to take fees for their services.

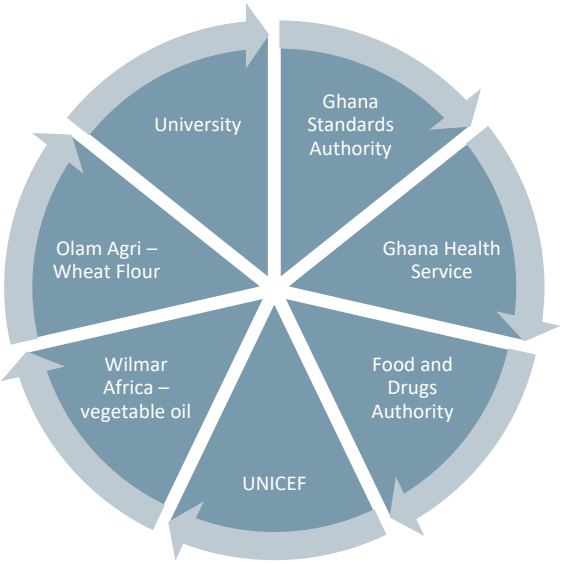
Table 5: Specifications for Cote d'Ivoire

Food vehicle	*Micronutrient*	*Prescribed levels*	*Comments*
Salt (Mandatory)	Potassium Iodate	Not less than 50ppm at production 30 -60ppm at import/export 20 – 60ppm at retail	Aligned with ECOWAS standard
Vegetable oil (Mandatory)	Vitamin A palmitate	16 – 24ppm– at production 11 – 24 ppm – In retail	
Wheat Flour (Mandatory)	Iron	Fe as Ferrous Fumarate 60 ppm +/- 10% Fe as Ferrous Sulphate 60 ppm +/-10% Fe as NaFeEDTA 40 ppm +/-10%	
	Folic Acid	2. ppm +/- 10%	

CODINORM conducts inspections and audits to ensure that private sector companies comply with national regulations on behalf of the government. Systems and structures are in place for routine inspections annually. Premix reconciliation is one major means of CODINORM verifying compliance with fortification regulations. Records were not available to verify the compliance status of companies. Import control is a mandate of Ministry of Trade. Certificates of compliance/conformity by CORDINORM are required for food products. The Ministry of Trade is, however, not able to effectively conduct port of entry enforcement because of lack of logistics such as RTKs. Products are thus released based on registration and conformity assessment certificate from CORDINORM. The Ministry of Trade will sometimes send samples to the central laboratory. Results, however, delay and hence cannot be a reliable tool for post of entry control.

- *Provision of RTKs for use by the regulator especially for Ports on entry monitoring*
- *Overstretched use of the LANEMA means that not many samples of fortified products can be sent to the lab.*
- *Market monitoring is also weak due to inadequate human resource and laboratory capacity.*

Ghana



LSFF and targeted food fortification are considered cost-effective preventive measure in controlling micronutrient malnutrition in the country. Different policy statements over the years gave prominent attention to salt iodisation and fortification of wheat flour and vegetable oil.

Food fortification is enshrined in the public health Act 851 (2012) and it mandates the Food and Drugs Authority (FDA) to adopt standards for LSFF and USI. The Ghana Standards Authority (GSA) has the mandate to develop and promulgate standards for the state. Ghana has standards for iodized salt, fortified wheat flour and vegetable oil. The standard for iodized salt is aligned with the ECOWAS standard. The standard for fortified Wheat flour and vegetable oil are however not aligned as demonstrated in Table 5 below.

The Ghana standard for fortified Wheat Flour and Vegetable oil are not aligned with the ECOWAS harmonised standards.

The Ghana Standards Authority has the mandate to develop and promulgate standards for the nation. The function of regulatory enforcement is under the purview of the Food and Drugs Authority (FDA). Both institutions are mainly financed by government. Activities under LSFF were sponsored by UNICEF and GAIN during the project phases. These two partners are still actively involved in the USI project in Ghana. They are currently supporting supply chain and quality assurance issues with artisanal salt mining in the country.

FDA oversees all mandatory domestic control activities. They have annual inspection plans for food processing facilities including wheat flour mills, salt processing facilities and vegetable oil processing factories. Artisanal facilities are, however, not very well controlled by the FDA. GSA also through its voluntary conformity assessment drive performs some control functions. One industry visited by the consultant could not tell the difference between the two institutions in terms of factory inspections.

Table 6: Specification for Salt, oil, and wheat flour in Ghana

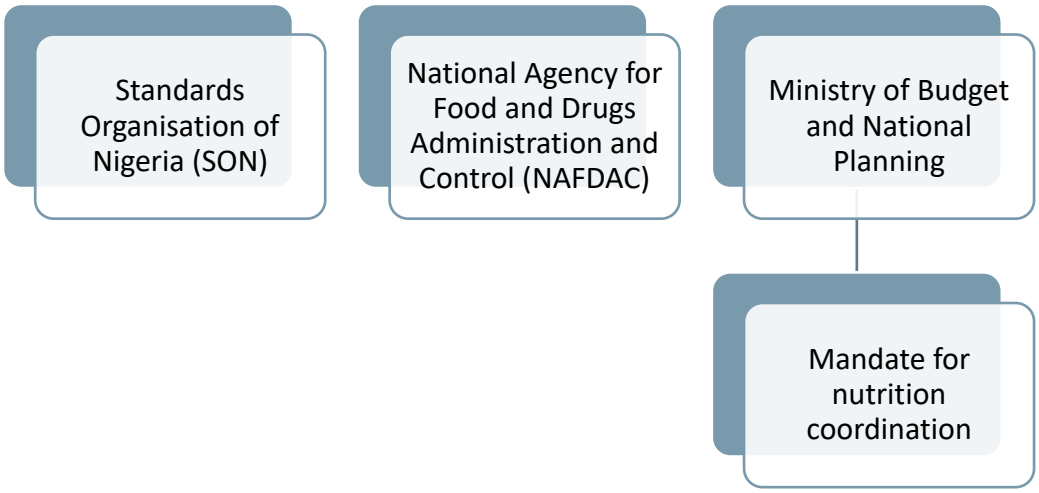
Food vehicle	*Micronutrient GS*	*GS levels*	*ECOWAS STANDARD LEVELS*
Salt	Potassium Iodate	Not less than 50ppm at production 30 -60ppm at import/export 20 – 60ppm at retail	Aligned with ECOWAS
Vegetable oil	Vit A palmitate	10ppm±10%	16ppm -24 ppm
Wheat Flour	Iron (form not stated)	58.5ppm +/-10%	Fe Fumarate 60ppm ± 10% Fe Sulphate 60ppm ±10% NaFeEDTA 40ppm ±10%
	Zinc (zinc Oxide)	28.3ppm±10%	NA
	Vitamin A (Palmitate)	2.0ppm±10%	NA
	Vit B1 (Thiamine)	8.4ppm±10%	NA
	Vit B2 (Riboflavin)	4.5ppm±10%	NA
	Vit B3 (Niacin)	59ppm±10%	NA
	Vit B9 (Folic Acid)	2.08pmm±10%	2.6ppm
	Vit B12	0.01ppm±10%	NA

Market surveillance is under the purview of the FDA. There hasn't been any recent survey to inform the level of compliance at the market level. FDA has regulatory presence at the major ports of entry and has a regulatory MOU with customs where it has access to the single window for clearing goods. Food items are only released by customs after they are cleared by FDA. Imported products are usually cleared by COA as FDA only have a satellite laboratory at the ports of entry. Samples are usually sent to the laboratory for confirmation only upon suspicion. It usually takes a long time for results to be released. Such consignments will usually end up on the market before the laboratory results are out.

1. *RTKs is a must for ports of entry activities. There is currently none in use.*
2. *There was no data to determine the level of compliance of fortified food with the regulation.*
3. *Alignment of the Ghana standards with the ECOWAS regional standards.*
4. *The form of iron is not specified in the Ghana standard.*

FDA and GSA have laboratory capacity that can perform micronutrient analysis on foods. There are also some public laboratories that are manned by government, such as research institutions and academia that can support laboratory testing and analysis. Some of these laboratories are accredited. Market monitoring is an FDA activity. Monitoring of LSFF is part of the FDA regulatory post-market monitoring. Samples are picked based on the risk and are submitted to the laboratory for evaluation. There were no results of market-monitored samples to verify compliance. Inspection records using premix reconciliation data indicates that all processing facilities are fortifying. Level of compliance is, however, unknown as analytical test results are not available.

Nigeria



Following the establishment of the USI program in 1992, the Standards Organization of Nigeria (SON) developed a standard (NIS 168:1992) that mandated that all food-grade salt be iodized at 50ppm iodine, using potassium iodide. The standard was revised in 1994 to replace potassium iodide with potassium iodate. Later in 2004, the NAFDAC Food Grade (Table or Cooking) Salt Regulations were developed and revised in 2019.

The NIS 168 standard provides specifications and test methods for food-grade salt. On the other hand, the NAFDAC regulation applies to "*any salt used as an ingredient of food for direct use by consumers and food manufacture or as a carrier of food additive and nutrients*". While the NIS 168 standard provides for iodization with potassium iodate, the NAFDAC Regulations provide either potassium iodate or iodide. Nevertheless, both sets of regulations provide for the same fortification levels: The NIS standard specifies a minimum iodine fortification level of 50 ppm iodine (or the equivalent of 84.3mg potassium iodate) at the factory/port of entry, 30mg iodine/kg of salt (or the equivalent of 50.5mg potassium iodate) at retail and 15ppm at the household level.

Nigerian standards are, however not aligned with the ECOWAS regions standards. The standards and values are also different from those of Ghana and Sierra Leone. Again, the Nigerian standards do not provide ranges but absolute minimum levels for micronutrients.

Table 7: Standards specifications for Nigeria

Food vehicle	*Micronutrient NS*	*NS levels*	*ECOWAS STANDARD LEVELS*
Salt	Potassium Iodate	25ppm	16 to 24 ppm
Vegetable oil	Vit A palmitate	20ppm	ECOSHAM 16ppm to 24 ppm
Wheat Flour	Iron (NaFeEDTA)	40ppm	60ppm Fumarate and Sulphate
	Zinc (zinc Oxide)	50ppm	NA
	Vitamin A (Palmitate)	2.0ppm	NA
	Vit B1 (Thiamine)	6ppm	NA
	Vit B2 (Riboflavin)	5.0ppm	NA
	Vit B3 (Niacin)	45ppm	NA
	Vit B6	6ppm	NA
	Vit B9 (Folic Acid)	2.6ppm	2.6ppm
	Vit B12	0.02ppm	NA

Nigeria has also made fortified sugar, margarine, and corn flour mandatory.

The National Administration for Food and Drugs Administration and Control (NAFDAC) and the Standards Organisation of Nigeria (SON) are 2 main institutions with mandates when it comes to food control of which fortification is part. SON is responsible for standard setting and has some regulatory functions. NAFDAC's main mandate is to assure food safety through the implementation of regulatory measures such as product registration, inspections, testing and analysis. Both institutions are mainly financed by government. Fortification in Nigeria is highly donor driven through GAIN and TechnoServe. SON and NAFDAC are therefore receiving financial support to fund activities under fortification. Both SON and NAFDAC have well-equipped laboratories, probably the most resourced laboratories in the sub-region. SON even has some laboratories across the country.

With an agreement that was negotiated by the NAFDAC, SON has the mandate to control LSFF at the factory level while NAFDAC regulates the market. Nigeria is the only country in the region that has data on compliance. While NAFDAC reports from a 2020 market survey that all samples picked are fortified, adequate levels of

Harmonization of the standards with the ECOWAS standards.

micronutrients as per the standard remain low. A report sighted by TechnoServe on factory level compliance indicates 100%.

Government policy prevents both SON and NAFDAC from operating directly from the ports of entry. That means that regulating at the ports is solely under the purview of customs.

1. *There was no data to determine the level of compliance of fortified food with the regulation.Alignment of the Nigerian National standards to the ECOSHAM standards*
2. *The on-going donor support for food fortification by GAIN and TechnoServe should have an exit strategy that guarantee sustainable transition of activities to the primary stakeholders, especially SON and NAFDAC.*

Senegal

Conseil Nationale de Developpement de la Nutrition	Nutrition International	Association Senegalaise de Normalisation
•Formulation and promotion of nutrition policy and programmes •Advise government on nutrition	•Support Salt Iodization •Ministry of Trade •Field officers – extension services	•Development and promotion of standards •Conformity assessment

The situation with LSFF in Senegal is no different from the rest of the francophone countries. The 2015 to 2025 national nutrition policy has a strong focus on LSFF of salt, cooking oil and wheat flour. The country joined the Helen Keller Intl project in 2005 and had national standards and regulations that are aligned to ECOWAS standards and UEMOA harmonised legislation for LSFF. Salt iodisation, however, started back in 1996 with support from Micronutrient Initiative (now nutrition international).

Table 8: Standards Specifications in Senegal

Food vehicle	*Micronutrient*	*Prescribed levels*	*Comments*
Salt (Mandatory)	Potassium Iodate	Not less than 50ppm at production 30 -60ppm at import/export 20 – 60ppm at retail	Aligned with ECOWAS standard
Vegetable oil (Mandatory)	Vitamin A palmitate	16 – 24ppm – at production 11 – 24ppm – In retail	
Wheat Flour (Mandatory)	Iron	Fe Fumarate 60ppm ± 10% Fe Sulphate 60ppm±10% NaFeEDTA 40ppm ±10%	
	Folic Acid	2.6ppm ± 10%	
Sugar (Voluntary)	Vitamin A (Retinol palmitate)	7.5 – 15ppm	

The Association Sénégalaise de Normalisation (ASN) is the state-mandated institution for setting, promulgating national standards and performing conformity assessment of products in Senegal. ASN is a member of ECOSHAM, ARSO, ISO, Codex and WTO. ASN adopted the ECOWAS standards for fortified salt, wheat flour and cooking oil as national standards. These have since been published in the national gazette as required by law.

Enforcement of the regulations is under the mandate of the Senegal Commission on Food Safety. Some level of laboratory capacity is reported. This was not physically assessed during the study.

1. *National survey to assess the level of compliance.*
2. *Need for laboratory audit within the country to know where capacities exist and how these can be utilized without duplication of resources.*

The Gambia

The National Nutrition Agency (NaNA) of The Gambia is the state coordinator and facilitator of all nutrition policies and interventions for the country. NaNA nutrition policy for the country strongly identifies food fortification as a strategic instrument in the control of micronutrient malnutrition in the country. In line with this, NaNA led the enactment of the Food Fortification Regulation 2005 which mandates the iodisation of salt meant for human and animal consumption. In 2020, the regulation was repealed with the enactment of a new regulation that encompasses salt iodization, wheat flour and vegetable oil fortification, adopting the ECOWAS standards.

The private sector (flour Mills) will like to have internal capacity for testing of fortified foods.

The Gambia Standards Bureau (TGSB) has the mandate and structures to develop, promulgate standards and conduct conformity assessments for private sector operators. The Food Safety and Quality Authority (FSQA) has the mandate to enforce food laws in the country. Both institutions are well resourced to perform their functions. They are part of international communities and take advantage of this for capacity building and resource maximization. Gambia has a central laboratory that was equipped under the FAO national food fortification project to be able to conduct testing and analysis of micronutrients in fortified foods. Both institutions and other stakeholders have received training in regulatory control of fortified food under the FAO project. The project also provided the country with some iCheck devices to facilitate field and ports of entry regulatory enforcement. FSQA also has an excellent relationship with customs at the seaport.

FSQA conducts regular inspections at processing facilities and ports of entry. Activities of both institutions were initially financed by the FAO project. The system is currently running on government funds and fully incorporated into the routine operations of these institutions.

Table 9: Standards specifications for The Gambia

Food vehicle	*Micronutrient*	*Prescribed levels*	*Comments*
Salt (Mandatory)	Potassium Iodate	Not less than 50ppm at production 30 -60ppm at import/export 20 – 60ppm at retail	
Vegetable oil (Mandatory)	Vitamin A palmitate	16 – 24ppm– at production 11 – 24 ppm – In retail	Aligned with ECOWAS standard
Wheat Flour (Mandatory)	Iron	Fe as Ferrous Fumarate 60 ppm +/- 10% Fe as Ferrous Sulphate 60 ppm +/-10% Fe as NaFeEDTA 40 ppm +/-10%	
	Folic Acid	2. ppm +/- 10%	

D- Summary of National-Level Compliance

1. All member states have national regulations and standards for iodized salt, fortified wheat flour and vegetable oil.
2. Ghana, Nigeria, Sierra Leone and Liberia are the only country that does not have their standards aligned with the ECOWAS harmonised standards.
3. All member states have mandated institutions for standard promulgation and enforcement. Enforcement capacity varies from country to country.
4. Food fortification standards of UEMOA countries and The Gambia are aligned with the ECOWAS standards. This is attributed to the fact that the implementation of LSFF in this sub-regional group was facilitated by Helen Keller Intl under the Fortify West Africa initiative. The remaining countries benefited from different donor agencies such as GAIN, FAO at different times. These supports were not coordinated.
5. All member states are active participants of ECOSHAM. This could serve as a good advantage when reviewing ECOSHAM standards and facilitate adoption at national levels.
6. There is no data at the country level to indicate compliance at factory, import and market. Nigeria is the only country that has some data to show.

7. Each country has a quality manual for internal and external control. There is evidence in all countries that both the private sector and the government regulators have received some training in the past from one technical partner or the other. The manual and training were harmonised for the West Africa Economic Monetary Union – (WAEMU-UEMAO for French) countries.

    a. These trainings have not been conducted for a while in some countries. Institutional memories might have been reduced due to staff attrition, retirement, and recruitment of new staff.

8. UNICEF, GAIN and NI are actively supporting salt iodization efforts in salt-producing countries where activities of artisanal salt mining impact negatively on compliance to the USI objective.

9. Generally, there is a weak presence of enforcement at the ports of entries. While Ghana and The Gambia has operational presence, their ability to take immediate decision is limited to review of documentation. Sampling is usually done but these are sent to a central laboratory where results are not release in good enough time for regulatory decisions. The use of RTKs at the borders comes handy for such purposes.

4.0-SWOT ANALYSIS

4.1- Strengths

1. **Commitment from governments of member states**

All countries in the region have enacted laws based on their policy direction to mandate the fortification of some food vehicles. Countries have also expressed willingness to legislate for the fortification of additional food vehicles if the scientific evidence shows that it can lead to improvement of the nutritional status of its population.

2. **Commitment from Private sector companies**

It was clear from the visits and interviews with the industry that fortification is considered part of product innovation and improvement to meet customer nutrition needs. Some private sector companies such as Tomato paste processing, rice importers and milling, condiments and spices and beverage processors are already into voluntary fortification. Governments can take advantage of these industry initiatives to streamline fortification by specific industries. Private sector food processing companies visited are already producing products to different market specifications and shipping across countries. Operations will become easier for these companies if standards are fully harmonised, especially for food vehicles being mandated for fortification by member countries of ECOWAS. This will greatly facilitate intra-regional trade in fortified food commodities and create an economy of scale for local industries to increase regional market access to fortified food in across West Africa under a harmonized regional standard framework and branding.

3. **Harmonisation of standards and regulatory framework including the use of a common logo**

Twelve (12) out of the fifteen (15) member states have already harmonised their standards for fortified Wheat Flour, vegetable oil and iodized salt. Interactions with standard-setting agencies in countries interviewed indicated a willingness to review standards to ensure that there is at least equivalence within the region. Again, this thinking is high on the agenda of ECOWAS under ECOSHAM and ECOREG. The harmonized ENRICHI logo is also being used for branding fortified food in 13 out of the 15 member countries of ECOWAS.

4. **Commitment from ECOWAS**

The Directorate of Industry within the ECOWAS Commission has expressed willingness to work with member countries to fully review and revise harmonised standards within the region. The commission is also committed to working with member states to work out a common regulatory framework.

5. **Policies and activities of the Africa Continental Free Trade Agreement (AfCFTA)**

AfCFTA is strongly pushing for projects that will reduce non-tariff barriers and increase intra-regional trade. In line with this, AfCFTA is actively working with regional regulatory agencies to harmonise standards and regulatory framework. Harmonized standards on food fortification are therefore a model for these harmonisation process under AfCFTA.

6. **Strong institutions**

Each member state has institutions with the right mandate to enforce food safety and food fortification regulations. These institutions in most countries are well-resourced and independent from political pressure. They are thus well positioned to enact appropriate regulations and enforcement of compliance to mandatory regulatory standards on food fortification.

7. **Laboratory capacity**

Capacity for testing and analysis exist within the region. Proper identification of micronutrient testing laboratories and creating a catalogue could potentially lead to an increase in testing and analysis within the region.

8. **Available funding from Development Partner operations**

There is a myriad of nutrition funding and development-partners operations within the region that are geared towards prioritizing investment in LSFF.

4.2- Weakness

1. **Limited capacity for testing and analysis**

Most of the laboratories in the region are not well resourced and fully certified to perform testing and analysis of micronutrients in food. Frequent equipment breakdown, absence of local maintenance personnel, difficulty in obtaining reference samples and untrained staff, are some of the challenges with testing and analysis. There is also the challenge with the availability and usage of RTKs.

2. **Inadequate coordination of activities among member states**

The best coordination was identified within the UEMOA block where standards and regulations are seemingly harmonised. Nigeria, Ghana, Liberia and Sierra Leone are not seen to be active in coordination activities of LSFF in the region. These are the only countries of the 15 member states that are having very different standards for wheat flour and vegetable oil. Interestingly, these countries are very influential in the regional standard development process. Their inability to adopt the regional standard brings to bear some level of weakness in commitment.

Poor coordination is not just with governments but also with the operations of development partners supporting food fortification in the region. Attempts in the past by some development partners to have coordination MoU have proved futile.

3. **Inability of governments to grant some tax relief for LSFF.**

A major challenge to food processing companies across the region is the inability or seemingly unwillingness of governments to provide some form of tax relief for the importation of micronutrient premix to support LSFF.

4. **Different standards mean extra operational cost for cross-border trade.**

A visit to a flour mill and an oil refinery in Ghana that trades across the borders of Ghana revealed that these companies have different products for different markets because of differences in standards and logos. This means extra cost to their operations.

5. **Poor documentation and institutional memory within ECOWAS**

One major observation during the mission to the ECOWAS Commission was document control. One could not find several ECOSHAM standards that have been promulgated in the past. This can be attributed to inadequate personnel, high staff attrition within the period but most importantly to poor data management as well as knowledge management and information systems.

4.3- Opportunities

1. **Government commitment**

Governments of all member states have shown commitment to taking advantage of LSFF to contribute to combatting micronutrient deficiencies and associated public health consequences for their populations. Again, governments ratification and endorsement of LSFF with ministerial resolutions for mandatory fortification within all 15-member countries of ECOWAS

2. **Commitment from partners**

There are some donor funding and development partners interested in LSFF in the region. The Bill & Melinda Gates Foundation remains the largest donor to advancing LSFF in West Africa with complementary resources from USAID.

3. **ECOWAS/WAHO influence**

ECOWAS and WAHO are quite strong regional economic and health institutions with a good influence and commitment to improving nutrition policy among member states. Again, these institutions are well positioned to source funding and technical support for projects on LSFF within the sub-region. Their influence and political strength are potential

positive tools to develop and manage a regional programme on LSFF. Such a programme could be a great tool for coordinating activities for synergy among member states under a regional alliance for food fortification coordinating efforts with national alliances and regulatory competent authorities to improve compliance to LSFF standards within West Africa.

4. **Local production of premix**

There is increasing capacity within the region, especially in Nigeria for local production and supply of fortificant premix. Harnessing this opportunity could be politically helpful in the region. Premix hubs could be established by major international suppliers to ensure reliable access to tax-free micronutrient premix for industries in West Africa to sustain food fortification.

4.4- Threats

1. **Sustainability of LSFF programmes after donor funding ease**

Apart from Nigeria and Burkina Faso, the remaining member states are currently not benefiting from any donor support for LSFF. Fortification is still ongoing; however, regulatory enforcement (inspections and monitoring) seems inadequate. There is no data in any country to tell the compliance rate in any country. Nigeria is the only country that has some data, thanks to GAIN and TechnoServe. This demonstrate that after sustained donor funding ceased about a decade ago a lot of traction was lost to the regional initiatives on LSFF and most countries became inactive on their commitment to food fortification.

2. **Inadequate controls at the major ports of entry**

Most member states do not have the right infrastructure and personnel to man the various ports of entry. Some depend on customs who are also not adequately positioned to perform the function of regulatory control. Samples must be sent to central laboratories for testing to facilitate product release. This is usually not achieved because of the turn-around time of samples in the laboratory which impedes trade. All ports of entry are not equipped with RTKs. Need to reinforce capacity on RTK and digitalized data systems for testing and compliance enforcement of imports at boarders and ports of ECOWAS. This should be coupled with regular quantitative analysis of composite samples for confirmatory analysis.

3. **Government commitment to support LSFF beyond policy documents and legal framework.**

The least expectation from industry is for governments to grant some import duty relief for the importation of premix. Applications have been filed for this in different countries

in the last decade and more, but none has been granted. This puts a shadow on the commitment from the side of governments to LSFF.

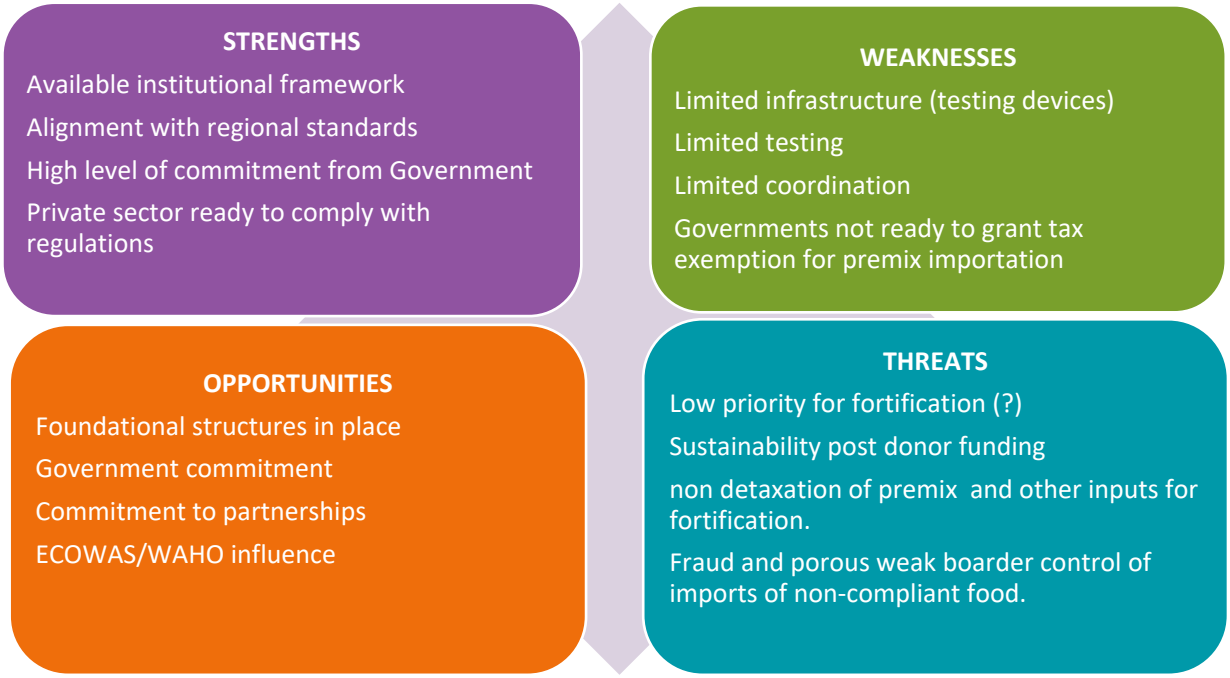


Figure 2: Summarized SWOT analysis chart

5.0- REGULATORY DATA MANAGEMENT

The national food fortification alliance has been the main platform for information sharing among stakeholders in each country. These public-private partnership platforms are useful, but they have become redundant or dormant in many countries because of funding constraints. Many stakeholders interviewed decry breaks in stakeholders' meetings. In their own words, '*we as stakeholders live in the dark and no one is accountable without the platform. We cannot tell if processing companies are fortifying to specification and if the government is enforcing the regulations to achieve total compliance'*. While there could be sustainable means of keeping the alliances functional, E-platforms are good alternatives and could be complimentary to physical meetings at both national and regional levels.

E-platform can be applied both at the national and regional levels by local stakeholders and ECOWAS/WAHO respectively. The Global Fortification Data Exchange exemplifies how e-data platforms can be useful for information exchange, management and communication. CRS and partners could thus invest in establishing similar E-platform in the region or at least at the country level.

6.0- RECOMMENDATIONS

The following recommendations are proposed to guide CRS and partners in their project design and implementation.

1. Commission a baseline survey in each beneficiary country to establish industry compliance to national regulations using market samples. This survey will provide CRS and partners the foundational data upon which process achievements will be measured. The Bill & Melinda Gates Foundation is working on a protocol for a quick feedback loop survey in Nigeria that could be adopted/adapted for this survey.

2. Develop and implement a harmonised capacity-building strategy for all regulatory agencies to strengthen their capacities in external Quality Assurance and data management with the possibility of using e-platforms. A successful application of this will lead to regulatory enforcement equivalence among competent authorise in the region. It will, therefore, be the initiating platform towards further promoting the free movement of fortified food across the region. It is currently not an issue among Francophone countries, Companies in Ghana are forced to produce 2 different products to satisfy the Ghana as well as the regional (especially Togo and Burkina Faso) markets.

3. Support ECOWAS to continue standard harmonisation processes and adoption among member states. ECOWAS-ratified standards are supposed to be binding on member states. To achieve this, refer to a recommendation by Tidiane Traore in a 2008 study report which intimated that UEMOA countries should include the B vitamins in the standard for Wheat Flour while Ghana and Nigeria take out Vitamin A from same.

4. Review voluntary fortification activities in the region led by the private sector to expand food vehicles under mandatory LSFF.

5. Conduct a laboratory audit across the region and create an e-catalogue of testing and analysis capacities across the region. A catalogue of laboratories within the region will help in product testing and analysis.

6. CRS and partners may consider working with the Kwame Nkrumah University of Science and Technology on the development of non-destructive RTK for detecting micronutrients in fortified foods.

7. Map all major industries (vegetable oil, wheat flour, salt) in West Africa and facilitate more effective industry associations committed to food fortification while providing the required enabling policy and regulatory environment for compliance of locally produced and imported fortified food vehicles under the mandatory fortification standards.

7.0- CONCLUSION

West Africa has made significant progress on harmonized mandatory standards on the levels of iron in wheat flour (60-ppm), folic acid in wheat flour (2.6ppm), vitamin A in vegetable oil (11-24ppm) and iodine in salt (15-45ppm) in most countries. These levels have been adopted by all Francophone countries and some Anglophone and Portuguese-speaking countries. There are however some variations in the inclusion of other micronutrients in wheat flour being fortified under mandatory standards and regulations in some countries in West Africa. There are some gaps in arriving at a fully harmonised standards as well as enforcement of regulations at the national levels. ECOWAS needs support to ensure a fully aligned harmonised standard that would achieve nutritional and sub-regional trade impacts of food fortification. This will further ensure that these are adopted and enforced at the regional level and by member states. Again, having a unified capacity reinforcement programme for regulatory agencies and micronutrient analytical laboratories will result in equivalence in testing and enforcement across the region. The introduction of an Electronic digital platform on compliance enforcement will serve as a big push for transparency among stakeholders at the national level and across the region. Harmonized regulations and transparent information sharing through a digitalized system will yield the benefits of relevant data to be tracked by industry and governments, not just for trade but also for levels of micronutrients in fortified food in the region.

APPENDICES

Appendix 1: Terms of Reference

A. Background

CRS received funding from the Bill and Melinda GATE Foundation to implement a large-scale regional food fortification project with a focus on Burkina Faso. The main objective of this project is to expand and improve large-scale food fortification in West Africa to close the nutrient gap for women, girls, and vulnerable populations.

Specifically, the project is aimed at:

1. Identifying existing capacity gaps to advance and support LSFF in West Africa generally and Burkina Faso specifically,
2. Support WAHO's capacity to undertake a preliminary assessment of the status of national food fortification alliances in West Africa to better understand their functionality and institutionalization processes, and
3. Address certain shortcomings by ensuring sustainable development of public sector capacities for the application of policies and mandatory legislative instruments for compliance with regulatory standards on food fortification with micronutrients in West Africa.

Indeed, the burden of malnutrition remains high despite the efforts made by governments and their partners. In West Africa, one out of two women of reproductive age is anemic with high deficiencies in key micronutrients (iron, vitamin A, zinc, folate, and iodine). There is a high burden of undernutrition with one out of three children under five stunted, 15% of infants born with low birth weight and high dependence on monotonous diet with close to 15% undernourished populations and 78% of children under two not meeting minimum dietary diversity mimicked by low minimum dietary diversity score among women and caregivers. Most countries do not have food based dietary guidelines and nutrient intake among populations fall below expectations when compared to targets for fruits, vegetables, legumes, and other micronutrient dense foods.

West Africa has made progress on food fortification, mandating the addition of iron and folate to wheat flour, vitamin A to cooking oil and iodine to salt. Recent efforts are also looking into fortifying bouillon cube, a condiment used for preparing food in most households. There are however potential gaps to address for ensuring sustainable food fortification to control and prevent micronutrient deficiencies through a food systems approach. With funding from BMGF, CRS with focus on the fourth Big Bet of the Foundation's Nutrition Strategy seeks to reinforce public sector capacity as pre- condition for LSFF programs to be targeted and effective while integrated into existing.

food and nutrition security policies and strategies, as well as the regulatory frameworks accompanying these.

B. Purpose

The overall objective of this assessment is to undertake a comprehensive situational analysis and assessment of the technical gaps to implement harmonized regional policies and regulatory standards for LSFF in West Africa with a specific focus on Francophone countries' capacity to achieve increased compliance with those policies and standards.

Based on the outcome of the evaluation, the Consultant will develop the regulatory compliance index and guidance note and propose an outline of an action plan for the implementation of the main recommendations of the evaluation to improve the regulatory compliance environment to mandatory standards for fortifying key food and condiment vehicles in West Africa (wheat flour, vegetable oil and iodized salt as well as future condiments that could be fortified under mandatory legislation, such as bouillon cubes). The consultant will undertake desk review and specific country visits during this assessment which may include Burkina Faso, Benin, Cote d'Ivoire, Ghana, Nigeria Senegal and Togo

C. Specific Tasks

Specifically, the consultant will evaluate and assess the institutional capacities of public sector regulatory authorities in member countries of ECOWAS, with a focus on regulatory governance, quality assurance/digital quality control, and enforcement of standards on food fortification in West Africa:

- Assess capacity for standardization, compliance enforcement and internal and external control of food industries fortifying foods.
- Assess the capacity of customs control of imported fortified food requiring compliance to mandatory fortification standards.
- Evaluate the capacity of national public health laboratories to analyze or test for micronutrients in fortified foods.
- Assess institutional capacities for compliance enforcement of mandatory regulatory standards on locally produced and imported fortified foods.
- Evaluate public sector “best practices” for compliance with food fortification standards.
- Develop a comprehensive SWOT analysis on compliance, enforcement, and digitalization of data systems for compliance and enforcement of standards on food fortification at national and regional levels.
- Assess the level of implementation of harmonized equivalent standards across West Africa under the ECOWAS Standards Harmonization Model (ECOSHAM).
- Assess the acceptance and effectiveness of social marketing campaigns, including the regional harmonized ENRICHED (ENRICHED)
- Assess gaps in strengthening the capacity of customs services to control the importation of micronutrient-fortified food vehicles in and within countries of the region.

- Review current mandatory standards for fortifying vegetable oil, wheat flour, and iodized salt in West Africa including harmonized standards.
- Examine gaps in capacity building of national regulatory laboratories to undertake analysis and monitor the micronutrient quality of fortified food vehicles.
- Assess capacity gaps in the competencies of Public Health Laboratories, Standards Setting Organisation, and Customs to implement enforcement of mandatory regulatory standards on locally produced and imported fortified foods,
- Evaluate efforts to promote collaboration between reference laboratories, customs services and national food regulatory authorities for the external control of fortified foods.
- Assess capacity to develop databases and record keeping systems for analytical data on micronutrients in imported and locally produced fortified food vehicles.
- Evaluate the digitization capacities of data information systems on the quality and compliance with standards of fortified food vehicles.
- Assess the estimated coverage of fortified foods and condiments (wheat flour, vegetable oil, bouillon cubes and iodized salt) potentially compliant to current national standards and harmonized standards being enforced in West Africa
- Review micronutrient premix accessibility and market structure for ensuring quality and quantity.
- Assess the capacity of the public sector to support private sector food industries to undertake the following actions:
    - Develop a plan to close GMP gaps if necessary.
    - Assist in the development of a Hazard Analysis and Critical Control Point (HACCP) system for qualified selected industries.
    - Establish and document industry-specific quality control standard operating procedures for fortification.
    - Develop standard analytical plans and procedures for micronutrient analysis of fortified food.
    - Develop a sampling plan for fortified foods.
    - Develop record keeping procedures for fortification.
    - Develop and document micronutrient premix storage/handling procedures.
    - Develop and document fortification equipment maintenance procedures.
    - Develop and document Sanitation Standard Operating Procedures (SSOPs)
    - Train QA staff on fortification quality management processes

- Periodically monitor the quality of fortified products on the market

- Perform a preliminary Good Manufacturing Practices (GMP) audit assessment on industries focusing on the following: (General Management Requirements, Fortification Equipment Maintenance and Operation, Materials/Components Handling, Premix Handling, Operational Procedures, Finished Product Handling).

- Develop a baseline laboratory micronutrient sampling and analysis plan for imported and locally produced fortified staple foods.

- Review the use of the harmonized ENRICHI logo in branding fortified foods across Francophone countries in West Africa and selected Anglophone countries, Gambia, Liberia and Sierra Leone.

- Assess the level of technical committees established to review and amend regional standards for harmonization across ECOWAS under ECOSHAM and their capacities to revise or modify the food fortification standard and technical document as needed.

D. Deliverables

The evaluation must allow the project to have a quality report in English and French version for wide dissemination on gaps in regulatory compliance enforcement on mandatory standards on food fortification in West Africa to inform the design of the second phase of the regional initiative on large scale food fortification in West Africa to sustainably contribute to the prevention and reduction in the high burden of micronutrient deficiencies in the region. Quantitative and qualitative evaluation methods will be used simultaneously to carry out this evaluation after a literature review phase.

The consultancy deliverables include a comprehensive consolidated report that covers:

i. Literature review of mandatory legislative standards on food fortification at national and regional level in West Africa and other similar evaluation assessments.

ii. Clear work plan and methodological guide for carrying out the evaluation and assessment on the effective implementation of mandatory standards on food fortification for compliance in West Africa. (The methodology will be validated by the project implementation Team of CRS under the leadership of the Technical Advisor for Enabling Environment and Legislative Compliance and the Project Manager).

iii. Technical capacities of standard setting and enforcement public sector institutions to implement national standards, harmonized regional policies and regulatory standards for LSFF in West Africa.

iv. Analysis on the capacities of standard setting and regulatory enforcement institutions with identified gap analysis on capacities of standard setting and regulatory enforcement institutions to enforce compliance to mandatory standards and periodically review mandatory legislation at national and regional level for efficiency in delivering micronutrients through fortified foods for impact on contributing sustainably to preventing and reducing micronutrient deficiencies in West Africa.

v. SWOT analysis on the institutional capacities, with a focus on regulatory governance, Quality Assurance/digital Quality Control and standards setting and enforcement of all countries in West Africa. This should provide data on the mapping of actors involved in food fortification standard setting and compliance enforcement with clarified roles and their comparative advantages.

vi. Guidance advancing digitalized regulatory enforcement compliance to mandatory standards on food fortification in West Africa. and recommended capacity development strategy to address gaps to improve on standard setting compliance enforcement with digital data management systems on LSFF.

The draft Consolidated evaluation study report will be submitted to CRS. Observations and amendments will be sent to the consultant for integration within 10 working days after receiving the report. The final documents will be submitted within 15 working days at the latest to CRS in three (3) paper copies and one (1) digital copy (electronic file).

The report outline for the report should cover:

- A table of contents
- A list of acronyms
- An executive summary: This summary will focus on the main conclusions, a maximum of two paragraphs describing the context of the consultation, summary of the objectives and expected results; major gaps analysis results, determinants that influence or can influence effective regulation and mandatory standard enforcement compliance on large-scale food fortification with recommendations improving the effectiveness of the regulatory compliance enforcement environment for large-scale food fortification in West Africa.
- A brief description of the methodology as well as the limitations of the evaluation.
- The results of the gap analysis on the regulatory compliance enforcement assessment.
- A chapter on SWOT analysis with general recommendations and a conclusion. Recommendations must include concrete and realistic measures for their implementation.
- An appendix comprising of the terms of reference, one or more summary tables, the tools used, the list of people and institutions engaged, the documents consulted and the work program.

E. Period of Performance and Deliverable Dates

The assignment spans the period between November 4, 2022, to February 15, 2023, up to 45 billable days. The consultant must complete all deliverables per the schedule outlined below.

Deliverables

1. Literature review and workplan/methodology & travel schedules
   Deliverable -Inception report- Due Date November 20, 2022

2. Capacity assessment and gap analysis on standard setting and regulatory compliance enforcement institutions in WA Deliverable- LSFF standard enforcement & compliance capacity gap analysis report (national and regional level for harmonized standards) Due Date December 20, 2022

3. SWOT analysis and Regulatory Compliance Index (RCI) on enabling environment for regulatory compliance enforcement for mandatory standards on food fortification in WA
   Deliverable- SWOT and institutional mapping document- Due Date January 15, 2023

4. Consolidating evaluation outcomes with a guidance document on advancing digitalized regulatory enforcement compliance to mandatory standards with RCI
   Deliverable -Draft consolidated evaluation report with the guidance document. Due Date January 31, 2023

5. Finalizing reports with inputs and feedback from CRS Team
   Deliverable -Final evaluation report. Due Date -February 15, 2023

Appendix 2: Checklist

A- FOOD FORTIFICATION REGULATORY COMPLIANCE AND COOPERATION

Interview Checklist

Stakeholders will be asked to state their names, the organization they work for and their role in that organization, and their involvement in LSFF. They will also be asked to grant their consent to the collection and use of the data they provide for the purpose of this study. Consent is indicated by involvement in the interview process.

Country: ……

B- STANDARD SETTING AGENCY

Name of institution ……

1. Is there any standard for specific fortified foods?
    a. If yes, complete the table below:

	Standard No. and title			**Target food vehicle**	**List of mandatory micronutrients**		
	No. and Title	**Date 1st published**	**Date of last revision**		**Micronutrients**	**Levels at factory**	**Levels in trade**

2. Is there any standard for premix?
    a. If yes, complete the table below.

	Standard no, and title			**Target food vehicle**	**List of micronutrients**	
	Standard No.	**Date 1st published**	**Date of last revision**		**Micronutrients**	**Levels**

3. How do these standards in 1 and 2 above relate to any regional (UEMOA, ECOWAS/WAHO, ARSO) or international (WHO/CODEX) standard in terms of the levels of micronutrients?

	National Standard	**Related regional /international standard**

4. Is there a standing technical committee (TC) for food (fortified food) standards?

    a. If yes: tick the roll for institutions that constitute the TC

	Institutions	**Tick**
	Standard institution	
	Food enforcement agency	
	Customs	
	Industry	
	Academia	
	Civil society groups	
	Consumer groups	
	Local experts	
	International expert	

5. Does the institution have internal laboratory capacity to test for the micronutrients in each standard?

    a. If yes, List micronutrients and food for which the laboratory can test.

b. Is the laboratory used for commercial testing?

c. How is the laboratory funded for equipment, reagents and personal salary?

d. Is there a formalised staff capacity building plan?

6. Does the institution have any specific challenge with:

    i. Standard setting and gazetting

    ii. Laboratory capacity

7. Is the laboratory or test method(s) accredited?

    a. If yes, kindly state the accreditation institution and the accredited method(s)

8. Does the institution collaborate with other laboratories in the country or outside the country for testing and analysis of micronutrients in fortified foods? If yes, kindly state these institutions

	Name of institution/laboratory	Public/private

9. Is the collaborating laboratory accredited for any micronutrient analysis?

10. Any comments of interest?

C- FOOD ENFORCEMENT AGENCY

1. Is the agency mandated by law to regulate the food sector (manufacturing, processing, trading, import, export)?

    a. If yes, state the primary law that gives the mandate.

2. Does the law allow the agency or superintending ministry to issue subsidiary legislation?
    a. If yes, state the clause in the primary legislation.
3. Is there specific legislation(s) that mandates the agency to enforce standards on fortified foods?
    a. If yes, state the title and year of enactment of the subsidiary legislation and if possible, the specific fortified foods that the legislation provides the enforcement mandate.
    b. Are the micronutrients and levels specifically stated in the legislation or the legislation refers to a specific standard(s) that contains the micronutrients and their levels?
4. Is there a provision in either the primary or subsidiary legislation for sanctions for noncompliance?
    a. If yes, provide the specific clause(s)

5. Does the institution have an internal laboratory?
    a. If yes, does it have the capacity (equipment and human resources) to test for micronutrients in fortified foods?

    b. Is there adequate budgetary allocation for laboratory consumables in relation to testing and analysis of micronutrients in fortified foods?

    c. State any continuous capacity building plan for laboratory staff.

    d. Is the laboratory or its test method accredited for testing and analysis of micronutrients in fortified foods?

        i. If yes, State specific micronutrient test method for which accreditation exists.

    e. Which institution does the accreditation?
    f. What is the turn-around time for testing micronutrients in fortified foods?
    g. Does the institution collaborate with other laboratories?

i. If yes, complete the table below.

	Name of institution/laboratory	Public/private	Any accreditation?

6. Does the institution have enough staff for inspections and surveillance? (Please, indicate how many staff)
    a. Factory inspections
    b. Market surveillance
    c. Ports of entry surveillance
7. Does the institution have a quality manual for inspection and surveillance?
    a. If yes, provide a reference or copy.
8. Are staff adequately trained in inspection and surveillance of fortified foods?
9. Is there a standardised inspection checklist for staff?
    a. If yes, provide a reference or copy.
10. How adequate are the following resources for inspections and surveillance.
    a. Transport
    b. Sampling kits
    c. Field testing kits
11. Are there Standard Operating Procedures (SOPs) for
    a. Factory inspections/audits
    b. Market surveillance
    c. Sampling of products for laboratory analysis
    d. Ports of entry (land, air and sea) inspections
12. Is there any collaboration with Customs? Explain
    a. Presence of staff of enforcement agency at ports of entry

b. Staff having access to manifests.

c. Staff allowed to conduct inspections on arriving consignments.

d. Staff are well equipped with test kits or laboratories to make decisions.

e. Staff have a mandate to decide on the release of consignments.

f. Staff have the mandate to detain suspicious and/or non-complying consignments.

13. Does the institution have an annual monitoring plan for fortified foods?

    a. Factory

    b. Market

14. Is there historic data on compliance? Can this be shared?

15. Is there any collaboration on enforcement with authorities in neighbouring countries?

16. Which of the following food products are processed locally?

    a. Wheat flour

    b. Vegetable/cooking oil

    c. Salt

    d. Tomato paste

    e. Bouillon cubes

17. Any specific challenge in the enforcement of regulations on fortified foods?

D- CUSTOMS

1. Is there a formal relationship between customs and the food enforcement agency? If yes, state the nature of the relationship.
2. Is customs aware of regulations and standards for fortified foods?
3. Are staff of customs trained in inspection of fortified foods?
4. What is the nature of reporting between customs and the regulator on imported foods that required fortification by law?

E- INDUSTRY

1. Are you aware of the fortification standards for foods that you process?

2. Are you or any member in your industry involved in the setting of the standards?
3. Are you aware of the regulation that enforces the standard?
    a. How was this officially communicated to you?
4. Do you have the capacity to produce fortified products to meet the standard(s)
    a. Equipment
    b. Staff
5. Are you currently producing to standard?
6. Do you have easy access to procurement of premix?
7. Do you have an internal Quality Assurance System to ensure that you fortify to specification?
    a. Laboratory for micronutrient analysis
    b. If not, are there competent laboratories in-country for use?
8. Do you get regular visits from the enforcement agency?
    a. Do they send a report to you after visits/inspections?
9. Are you informed of your compliance level when your products are sampled from the market and tested?
10. Are there any specific challenge(s) with producing fortified foods to specification?

F- WAHO

1. Is there any standard for specific fortified foods?
    a. If yes; complete the table below:

	Standard No. and title			**Target food vehicle**	**List of mandatory micronutrients**		
	No. and Title	**Date 1st published**	**Date of last revision**		**Micronutrients**	**Levels at factory**	**Levels in trade**

2. Is there any standard for premix?

    a. If yes, complete the table below.

	Standard no, and title			**Target food vehicle**	**List of micronutrients**	
	Standard No.	**Date 1st published**	**Date of last revision**		**Micronutrients**	**Levels**

3. How are these standards coordinated with the standards of member states?
4. Are the regional programmes aimed towards ensuring that all member states have their standards aligned with or equivalent to the WAHO standards?
5. Does the institution organise regional capacity-building programmes for member states?
6. Does WAHO have any study on the laboratory capacity within the region?
7. Are there new vehicles under consideration for fortification?
8. How does WAHO fund its standard setting, consultation and capacity building for member states?

G- ALL STAKEHOLDERS (Questions on Public-Private Partnerships)

Stakeholders

* **Who** are the main stakeholders in LSFF implementation in your country/in West Africa?
    - ❖ Think of those who would be impacted by LSFF implementation (either because they are involved in implementation, or they are the targets of implementation)
* **What** is the role of each stakeholder?
    - ❖ Here, the interviewee will speak about the specific function each stakeholder performs in relation to LSFF implementation.
* **How** would you rank the influence of each stakeholder in LSFF implementation?
    - ❖ This involves the capacity of the stakeholder to shape or impact LSFF implementation and to shape the activities of other stakeholders.

* **What** government institution oversees LSFF implementation? (Would you change this? Why?)
* **What** platforms exist for partnerships (consultation, collaboration, cooperation, communication) amongst stakeholders for LSFF implementation?
    - ❖ These could be public-sector platforms, private-sector platforms or public-private platforms.
* **Is** there a national fortification alliance in your country?
* **Who** are the members of the national fortification alliance in your country?
    - ❖ Also, whether there is a membership process and what it is
* **Is** the national fortification alliance in your country useful/productive? (Why and how?)

Processes

* **How** are institutional alliances established for LSFF implementation?
* **Who** is generally responsible for setting up institutional alliances for LSFF implementation?
* **When** was the national fortification alliance in your country established?
* **Who** was responsible for setting up the national fortification alliance in your country?
    - ❖ Was this a donor-driven initiative or was it a government-driven initiative or driven by the private sector?
* **How** was the national fortification alliance in your country established?
    - ❖ Here, the interviewee should think about whether it is a formal or informal alliance, set up by legislation or policy, or incorporated as a corporate entity under the law.
* **What** is the leadership structure for the national fortification alliance in your country?
    - ❖ This includes the composition of the institutional leadership, rules for leadership selection and progression of membership.
* **How** and how often does the national fortification alliance in your country meet?
* **What** kinds of activities are the national fortification alliance in your country involved in?
    - ❖ This involves both planned and unplanned activities. The focus here is to understand how stakeholders understand the role and function of the alliance and how they engage with the alliance.
* **Are** there ways to measure the impact of the alliance on LSFF implementation? If so, is there data on such measurements, and how they are reached/set?
* **How** is the national fortification alliance in your country funded?

* **What** mechanisms for transparency and accountability exist for the governance of the national alliance in your country?
    - ❖ Here, it is important to know if there are standard operating procedures, membership rules, handbooks for engagement, etc
* **How** does the national fortification alliance in your country identify and address problems?

Challenges

* **What** are the main challenges in LSFF implementation in your country/West Africa?
* **What** are the main institutional constraints for partnership building and engagement in LSFF implementation?
    - ❖ Here, constraints around communication and collaboration may be identified.
* **What** are the causes of these challenges?
    - ❖ Here, the interviewee should consider the source of the challenge, whether it is a particular stakeholder, the enabling environment, lack of resources, or some other cause.
* **How** do these challenges impact LSFF implementation?
    - ❖ Here, the interviewee should think of the effects of each challenge identified and the stakeholders it impacts.
* **What** is the relationship between public and private sector stakeholders like?
* **What** are the main challenges faced by the national fortification alliance in your country?
* **What** are the sources of these challenges?
* **How** are the challenges being addressed?

Recommendations

* **How** can LSFF implementation be improved?
    - ❖ Here, the interviewee should indicate specific activities and interventions and what impact they are expected to make.
* **How** can the challenges of institutional engagement and partnership be addressed at the national and regional levels?
* **Who** should be responsible for addressing these challenges?
* **What** has worked well in addressing institutional challenges in the past? (Why?)
    - ❖ The interviewee is encouraged to think of this in relation to LSFF implementation.

* **What** would you change about the current national alliance structure? (Why?)
    - ❖ Think here in terms of the processes you have control over, if any, and those you do not
* **What** would you retain about the current national alliance structure? (Why?)

Appendix 3: List of actors visited by consultants/TA in different countries for the LSFF project in WA.

Institution	Position/Role	Country	Date visited
Conseil National de Développement de la nutrition	Adama Nguirane : Directrice du Conseil Nationale de Développement de la Nutrition au Sénégal	Sénégal	20.01.2023
Nutrition International	Sadji Mamadou :	Sénégal	20.0102023
Association Sénégalaise de Normalisation	Ndeye Maguettte DIOP: Directrice	Sénégal	20.01.2023
Ghana Standards Authority	Mrs. Joyce Okeree (Director, standards)	Ghana	26.01.2023
Olam Agri	Mustapha Jalali Quality Management Grains Head	Ghana	26.01.2023
Wilmar Africa Gh. Ltd	Moses Adade	Ghana	26.01.2023
Ghana Health Service	Mrs. Veronica Quartey (Ag. Director, nutrition)	Ghana	27.01.2023
Kwame Nkrumah University of Science and Technology	Dr. Herman Lutterodt	Ghana	27.01.2023
UNICEF	Jevaise Abolla (Nutrition officer)	UNICEF - Ghana	27.01.2023
Food and Drugs Authority (FDA)	Dr. Cheetham Mingle (Head, Research & Nutrition) Gloria Assum-Kwateng (Head, airport control) Banaman Quist	Ghana	27.01.2023
ECOWAS Commission	Lassane Kabore (Director-Industry) KAFANDO Christian Namalguedzanga (Ind Development and ECOWAS programme officer)	Nigéria	30.01.2023

Federal Ministry of Budget and National Planning	Mrs Nduka C Nelson, Head, Nutrition Desk	Nigéria	31.01.2023
Standards Organisation of Nigeria (SON)	Yunusa B. Muhammed Mrs Talatu Ethan (Director, Lagos) Ikhenebome David Ag. Director- lab services	Nigeria	02.02.2023
National Agency for Food and Drugs Administration and Control (NAFDAC)	Charles U. Nwachukwu (Director)	Nigeria	02.02.2023
Association des industriels de la filière oléagineuse de l'UEMOA et de la CEDEAO (AIFO)	Euloge HINVI (Ambassadeur/Secretaire Executif) Jeannine Agbo Monlemey	Bénin	23.01.2023
Unicef	Mr. Bonaventure Muhimfura (Chef Nutrition) Sagbadja Agossou Felicien (Nutrition Officer)	Bénin	23.01.2023
Ministère de l'Agriculture, de l'Elevage et de la Pêche du Bénin. **MAEP**	Kanmadozo T. Conrad Dedegbe Dominique Mr. Jacques Houngbenou (Directeur DANA Empeche) Direction Nationale de la Nutrition Appliquée	Bénin	23.01.2023
PAM	Ali Ouattara (country Director & Residence Rep.) Caroline Schaefer (Directrice Adjointe du PAM)	Bénin	24.01.2023

	Imayath Djibri Moussa (Food technologist)		
Agence nationale de sécurité alimentaire, de l'environnement, de l'alimentation et du travail (ANSSEAT) DCANA	NIKIEMA Fulbert/DCANA	Burkina Faso	06/02/2023
	SOMDA Asseto/CDS-SMA		
	SAWADOGO Sandaogo/CDS-SPCA		
	SAMA Ouambila/SNA		
	ILBOUDO Inoussa/CDS-SCAA		
Direction de la Nutrition/Lead ANF	GUEYE Abdoulaye/DN-FSSA	Burkina Faso	06/02/2023
	THIOMBIANO Coulibaly Nana/DN-FSSA		
	BAMBARA Estelle/DN		
SN-CITEC	DIALLO Amadou	Burkina Faso	07/02/2023
DOUANE/ Direction de la réglémentation, de la facilitation et de la coopération douanière	YAMEOGO Patrick/DGS/DRFC-A	Burkina Faso	07/02/2023
	DABIRE D Jonas/DRFC		
	BAGRE Raymond/DRFC		
	OUEDRAOGO Kassoum/DRFC		
	KONKOBO Daouda/DRFC		
AGENCE BURKINABE DE NORMALISATION	Sawadogo Aissama/DCQ/SLAT	Burkina Faso	08/02/2023
	Nacanabo Adama/DCQ/SISM		
	Yaguibou Gustave/SC		
IRSAT/DTA	KABORE/WARE Larissa Y/Chercheur	Burkina Faso	09/02/2023
	BATIONO Fabrice		
	KABORE Donatien		

Appendix 4: List of documents consulted.

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4. Sablah, M., Klopp, J., Steinberg, D., Touaoro, Z., Laillou, A., & Baker, S. (2012). Thriving public—private partnership to fortify cooking oil in the West African Economic and Monetary Union (UEMOA) to control vitamin A deficiency: Faire Tâche d'Huile en Afrique de l'Ouest. Food and Nutrition Bulletin, 33(4_suppl3), S310-S320

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9. Qaim, M., Stein, A. J., & Meenakshi, J. V. (2007). Economics of biofortification. Agricultural Economics, 37, 119-133.

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11. ECOWAS Assembly of Health Ministers. (2006), 7th General Assembly Resolution on mandatory fortification of cooking oil and wheat flour. Abuja:

12. ECOWAS. ECOWAS Assembly of Health Ministers. (2008) 9th General Assembly Resolution to implement mandatory fortification of cooking oil and wheat flour. Yamousokro

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