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Senegal at a Crossroads

Prioritizing Large-Scale Food Fortification under Financial Uncertainty

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Abstract

Senegal long has been committed to large-scale food fortification (LSFF), especially for salt, edible oil, and wheat flour, bolstered by a set of multi-sectoral nutrition strategies and institutional coordinating mechanisms. Yet, due to recent macroeconomic pressures and reductions in donor funding, the country is at a crossroads, revealing key gaps in the sustainability of its current LSFF program even as new vehicles, such as rice and bouillon, are emerging on the fortification policy agenda. Based on interviews with over two dozen public, private, and civil society sector actors, we utilize the Political Economy Diagnostic of Large-Scale Food Fortification (PEDAL) to highlight strengths of the Senegalese LSFF program and weaknesses that need to be prioritized. Among the latter include the stalled financing for the national fortification alliance, known as COSFAM, insufficient testing materials and laboratories, and rising costs of premix and raw materials. Several innovations were promoted by respondents to address some of these challenges, including either the decentralization or regionalization of laboratory capabilities, a central buying center for premixes, and online data platforms to track compliance. By reflecting on Senegal's long experience and current challenges with scaling its fortification efforts, the analysis provides useful insights to countries with more nascent fortification programs about the prerequisites for ensuring LSFF sustainability.

Keywords: Industry, large-scale food fortification, nutrition, political economy, policy implementation, Senegal

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Acronyms

AMIS	Association des Meuniers Industriels du Sénégal (Association of Industrial Millers of Senegal)
ASCOSEN	Consumer Association of Senegal (Association des Consommateurs du Sénégal)
ASN	Agence Normalisation du Sénégal (Senegalese Standards Agency)
CLM	Cellule de Lutte contre la Malnutrition (Nutrition Coordination Unit)
CNDN	Conseil National de Développement de la Nutrition (National Council of Nutrition Development)
COSFAM	Comité Sénégalais pour la Fortification des Aliments en Micronutriments (Senegalese Committee for Food Fortification)
CRS	Catholic Relief Services
DCSC	Division de la consommation et la sécurité des consommateurs (Division of Consumption and Consumer Safety)
DCI	Direction du Commerce Intérieur (Directorate of Internal Trade)
DRI	Direction du Redéploiement Industriel (Department of Industrial Redeployment)
ECOWAS	Economic Community of West African States
EU	European Union
FRA	Fabrication et de Mise en Vente Autorisation (Manufacturing and Marketing Authorization)
GAIN	Global Alliance for Improved Nutrition
GIE	Groupements d'intérêt économique (Economic interest groups)
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Corporation for International Cooperation)
GMD	Grands Moulins de Dakar (Large Miller of Dakar)
HKI	Helen Keller International
HPLC	High-performance liquid chromatography
IRD	Institut de recherche pour le développement (Research Institute for Development)
ITA	Institut de Technologie Alimentaire (Food Technology Institute)
LANAC	Laboratoire National d'Analyses et de Contrôle (National Laboratory of Analysis and Control)
LSFF	Large-Scale Food Fortification
MIC	Ministère de l'Industrie et du Commerce (Ministry of Industry and Trade)
NI	Nutrition International
NMA	Nouvelles Minoteries du Sénégal (New Mill of Senegal)
PEDAL	Political Economy Diagnostic for Large-Scale Food Fortification
PNDN	Politique nationale pour le développement de la nutrition (National Policy for the Development of Nutrition)
PRN	Programme de renforcement nutritionnelle (Nutrition Enhancement Program)
PSF	Plan stratégique de fortification (Fortification Strategic Plan)
PSMN	Plan Stratégique Multisectorielle de Nutrition (Multi-sectoral Strategic Plan for Nutrition)
SFA	Sénégalaise des Filières Alimentaires (Senegalese Food Industry)
SSS	Société Nouvelles des Salins du Sine Saloum (Sine Saloum Salt Company)
UCAD	Université Cheikh Anta Diop de Dakar (University of Cheikh Anta Diop of Dakar)

UGB	Université de Gaston Berger de Saint Louis (University of Gaston Berger of Saint Louis)
UNCS	Union Nationale des Consommateurs du Sénégal (National Union of Senegalese Consumers)
UNICEF	United Nations Children's Fund
WFP	World Food Program

Introduction

For almost thirty years, Senegal has demonstrated a strong commitment to improving nutrition (Deussom et al. 2018; Kampman et al. 2017). Between 1992 and 2014, under-five stunting fell from 34 to 19 percent (Kampman et al. 2017)—a decline that further continued in 2023, when the equivalent stunting rate was 15.1 percent (ANSD and ICF 2024). Nutrition interventions have been underpinned by a commitment to both multi-sectorality and decentralization, with the country's local governments gradually playing a stronger role in nutrition policy implementation (Spray 2018). Large-scale food fortification (LSFF) has been a key component of Senegal's nutrition agenda. Along with Nigeria, Senegal was a leader in West Africa with its adoption of LSFF standards in the 2000s for edible oil, wheat flour, and salt. Following the release in 2006 of the Strategic Plan for the Fortification of Foods in Senegal (PSFAMS), the country has now launched two subsequent fortification strategies, including most recently in May 2025.

However, Senegal is at an important crossroads, increasingly facing pressures to maintain its nutrition successes and momentum around its LSFF agenda in the face of both mounting financial pressures, continued nutrition challenges, and the priorities of the new government elected in April 2024. Specifically, in early 2025, the International Monetary Fund froze an almost $2 billion bailout program to the country after learning that the country's debt previously was misreported (Crowe 2025); the country's debt to GDP ratio now exceeds more than 100 percent (IMF 2025). This comes amid the cuts to foreign aid by the US government in 2025, which disproportionately impacted Senegal, especially in the health and education sectors (Conroy and Pecquet 2025). This means that in a context of growing resource scarcity, it will become more challenging to keep LSFF prioritized by both the government and its traditional donor and technical partners.

At the same time, the reach of some of the fortification efforts still remains substandard, and new health concerns are emerging. Despite a salt iodization program that began in 2000, only 44 percent of rural households have access to iodized salt compared with 70 percent of their urban counterparts (ANSD and ICF 2024). In spite of the mandated requirement to add iron to wheat flour since 2009, recent studies find a prevalence of anemia deficiency among pregnant and non-pregnant women at 51 and 48 percent, respectively (Ndiaye et al. 2018). Obesity is also becoming a growing concern in the country, and a quarter of the population is affected by arterial hypertension (CLM 2018), which is influenced by the country's high levels of salt consumption (Kebe et al. 2023).

Consequently, this paper addresses several questions: What factors have contributed to Senegal's successes in the domain of LSFF? What longstanding bottlenecks endure? And what new concerns are emerging on the horizon? To do so, the paper utilizes the Political Economy Diagnostic of LSFF (PEDAL), which is a systematic framework to collectively examine the interests, ideas, leverage, institutional architecture, and technical requisites among the public, private, and civil society sectors to adopt and implement LSFF (Resnick 2024). After first providing an overview of Senegal's nutrition policies, programs, and institutional landscape, PEDAL is applied to better understand where there are opportunities for building continued momentum around Senegal's

LSFF agenda. Primary attention is given to progress with existing food vehicles that are mandated for fortification, including salt, edible oil, and wheat flour, with secondary attention given to new vehicles under consideration, especially rice and bouillon. The analysis draws on insights from 26 key informants across 18 key organizations interviewed between April and September 2025 (see Appendix 1).[1] The respondents were identified based on an initial stakeholder mapping of key institutional bodies implicated in LSFF for Senegal based on a review of secondary resources. Throughout the interviews, several additional respondents were identified and contacted for a fuller perspective. To preserve anonymity of individual respondents, reference to evidence and opinions provided through these interviews are indicated in the text by using a key informant interview (KII) number.[2]

The findings suggest that there is substantial reflection on LSFF, the intention and impacts of fortification, and needed amendments to vehicles and micronutrients. Several strengths emerge from the analysis, including that private sector and civil society buy-in to LSFF is high, there are leading ministries and coordinating mechanisms, and a high capacity in the academic community to support data, research, and analysis. At the same time, PEDAL reveals key priorities that need to be supported to ensure Senegal's LSFF achievements retain momentum. Among others, these include stalled financing for the national fortification alliance, insufficient testing materials and laboratories, and rising costs of premix and raw materials. Given this context, several stakeholders expressed concern about expanding into new food vehicles. For instance, there are worries about the salt in bouillon and the potential overexposure of the population to too many micronutrients. By reflecting on Senegal's long experience and newly changing conditions, the analysis also provides insights about whether and how best to achieve sustainability of LSFF in countries that are newly scaling up their fortification efforts.

Senegal's Nutrition Policies and Programs

In 1994, the devaluation by 50 percent of Senegal's currency, the CFA franc, doubled the cost of imports and stimulated a massive increase in poverty and malnutrition (Diagana and Reardon 1999). After being elected president in 2000, Abdoulaye Wade demonstrated his commitment to targeting rising malnutrition by establishing in 2001 the Nutrition Coordination Unit (CLM) within the prime minister's office. Given that Wade was a champion of nutrition interventions, his long presidential tenure of 12 years helped intensify various nutrition efforts. Macky Sall, who was one of Wade's prime ministers and succeeded him as president in 2012, retained a high-level commitment to tackling child malnutrition (Spray 2018). Under those two presidents, the country had several different nutrition policies and programs, including the

[1] Interviews were mostly conducted in French with all respondents and alternatively led by the two co-authors.

[2] All respondents reviewed a consent form that communicated the intent of the interview and emphasizing that no individuals would be specifically identified by name in this document. They were also requested to consent to the inclusion of any quotes, only signified by KII number, in this report. Finally, they were asked whether they were willing to be recorded to facilitate note taking. Only one respondent refused on this last point.

Nutrition Enhancement Program (PRN, 2002-2014), and the Multisectoral Strategic Plan for Nutrition in Senegal (PSMN, 2018-2022) (Brar et al. 2020; CLM 2018). The latter plan is embedded within Senegal's broader National Policy for the Development of Nutrition (PNDN), which spans the 2015-2025 horizon, and represents part of the human capital pillar of the country's larger development agenda, known as the Senegal Emergent Plan (PSE, 2014-2023). In 2020, CLM was replaced with the National Nutrition Development Council (CNDN) with its own secretariat, remaining under the Prime Minister's office.[3]

Table 1: Select chronology of activities relevant to Senegalese nutrition policy

Years	Events, Laws, Regulations, Plans, Strategies & Programs
1994	50% Devaluation of CFA
1995	Prime Minister's Decree setting standards for iodized salt production and distribution
1997	National Action Plan for Nutrition (1997-2002)
2000	Abdoulaye Wade elected president
2001	Presidential Decree 2000-1154 mandating iodization of edible salt; Nutrition Coordination Unit (CLM) established
2002	Nutrition Enhancement Program (PRN, 2002-2014)
2006	Committee for the Fortification of Foods with Micronutrients (COSFAM) established; National Fortification Strategy (2006-2011)
2007	Abdoulaye Wade re-elected president
2008	Food price crisis causes doubling in price of rice
2009	Decree 2009-872 on Fortification of Refined Vegetable Oils and Flour(2009); Universal Salt Iodization Project (PIUS) (2009-2014)
2011	Revision of iodine standards to UEMOA recommendations; Senegal joins Scaling up Nutrition (SUN) movement
2012	Macky Sall elected president
2014	Revision of fortification standards to align with ECOWAS standards; Senegal Emergent Plan (PSE, 2014-2023)
2015	National Nutrition Development Policy (PNDP)(2015- 2025)
2017	Fortification Strategic Plan (PSF, 2017-2021)
2019	Macky Sall re-elected president
2020	CLM becomes the National Nutrition Development Council (CNDN)
2024	Bassirou Diomaye Faye elected president
2025	Third Fortification Strategic Plan (PSF, 2025-2029); Credit rating downgrade and sell off of Eurobonds due to finding of $6 billion in hidden debt

Sources: Brar et al. (2020), CLM (2018), Ka and Manus (2018), McDevitt-Irwin (2024), Spray (2018), and various media sources.

As seen in Table 1, LSFF has received high-level attention since the early 2000s. Following a trend in much of the world, Senegal had already adopted a Salt Iodization Strategy in 1994. In 2001, Wade issue a Presidential Decree requiring mandatory fortification of edible salt. In 2006, the Senegalese Committee for the Fortification of Foods with Micronutrients (COSFAM) was established to provide a platform for dialogue on LSFF that including the public and private sector, consumers, researchers, and technical and financial partners (Ka and Manus 2018). Thereafter, the

[3] The CNDN also houses the Scaling Up Nutrition movement in Senegal.

country's first National Fortification Strategy (2006-2011) was launched. In 2008, the Senegalese Standards Agency (ASN) adopted mandatory standards for vitamin A in edible oils and iron and folic acid in wheat flour, and these standards (Decree 2009-872) came into force the following year. The current standards (see Table 2) were revised in 2014 to allow for regional harmonization with fortification standards issued by the Economic Community of West African States (ECOWAS).[4] A second strategy, known as the Fortification Strategic Plan (PSF, 2017-2021) was part of the PSMN. The third and most recent fortification strategy, PSF 2025-2029, was launched in mid-2025.[5]

Table 2: Mandatory fortification standards in Senegal

Food vehicle *(Standard)*	**Coverage**	**Micronutrient**	**Standard levels (mg/kg of food vehicle)**
Salt *(NS ECOSTAND-048: 2015)*	All imported, domestically produced, and exported salt; also as part of processed foods	Potassium iodate or potassium iodide	30-60 mg/kg for import and export; 20-60 mg/kg for market distribution
Edible oils *(NS ECOSTAND-008:2014)*	All imported and domestically refined vegetable oils (palm and palm kernel, cotton, peanut, sesame, sunflower, canola, corn, soybean)	Vitamin A (retinyl palmitate)	16-24 mg/kg for production and import; 11-24 mg/kg for market distribution
Wheat flour *(NS ECOSTAND-047:2015)*	All imported and domestically produced soft wheat flour	Iron	Iron (fumarate or ferrous sulfate): 54-66 mg/kg, Iron EDTA:36-44 mg/kg
		Vitamin B9 (Folic acid)	2.6 mg/kg

Source: Adapted from Faye et al. (2025)

Several recent studies show the nuanced impacts that these fortification efforts are having on addressing micronutrient deficiencies. According to Wegmüller et al. (2025), the coverage of households with iodized salt increased from 56 to 81 percent of households between 2010 and 2014, only to fall to 71 percent in 2018 and then 35 percent in 2023. Nevertheless, Wegmüller et al.

[4] ECOWAS standards are supposed to be revised every five years. The revision process began in quarter 2 of 2023.

[5] The Global Alliance for Improved Nutrition (GAIN), the Micronutrient Initiative (now Nutrition International), and Helen Keller International (HKI) were pivotal partners in supporting these initial LSFF efforts. GAIN provided CLM with its initial grant to develop the first fortification strategy, and all the partners supported with providing premix, fortification equipment, and capacity training with internal quality assurance and quality control (QA/QC) functions (Ka and Manus 2018).

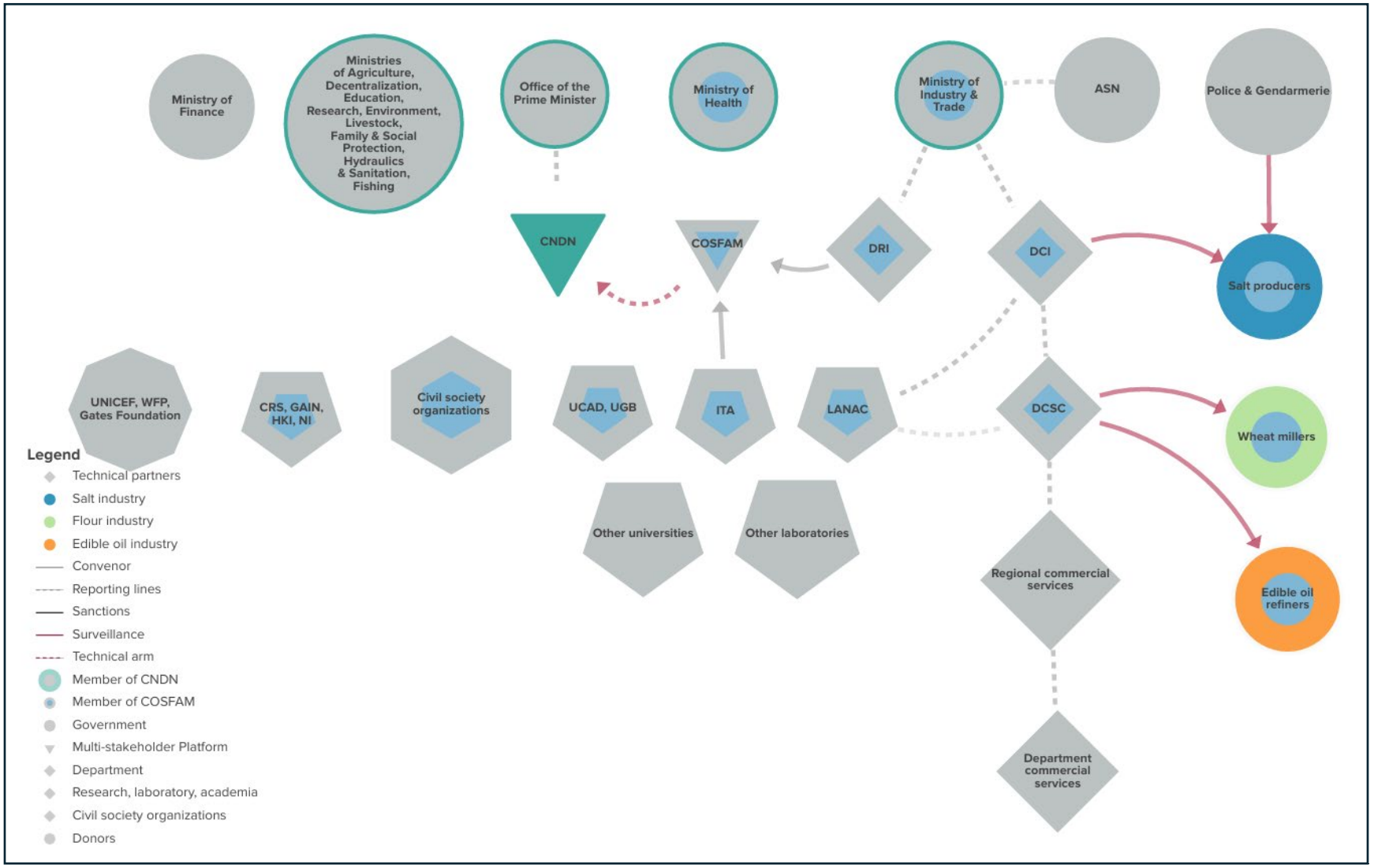
(2025) find that because of the use of iodized salt in processed foods, especially bouillon, nonpregnant females of reproductive age are getting adequate iodine status, with a few regions in danger of overconsumption of iodine. Others have noted that the standard for folic acid fortification of wheat flour used in Senegal is below the current World Health Organization (WHO) guidelines. This is concerning since, even with the existing standards, one study revealed that 54.8 percent of women of reproductive age suffered from a folate deficiency (Ndiaye et al. 2018). Although not part of current standards, there is also growing consideration about adding zinc to the wheat flour standard to address the high zinc deficiency in the country (Adams, Engle-Stone, et al. 2024); revising the flour standard to introduce zinc has been discussed for several years (CLM 2018).

It is critical to better understand some of the factors behind these coverage and micronutrient consumption trends, especially given new efforts to expand mandatory standards to two additional food vehicles: rice and bouillon. Rice is the most widely consumed cereal in Senegal, with 198 grams consumed per person per day (WFP & NI 2019). Ever since the food price crisis in 2007/2008, when Senegal was hit badly by price inflation driven by its dependence on imported rice (Resnick 2015), the cereal has been targeted for government self-sufficiency initiatives, including the 2014 National Rice Self-Sufficiency Program. Several micronutrients are being considered for rice fortification, including iron, vitamin A, various B vitamins (including folic acid) and zinc (Adams, Engle-Stone, et al. 2024). Bouillon cubes are consumed by 90 percent of the population, including in rural areas and among poorer households (Adams, Vosti, et al. 2024). Several studies suggest that fortifying bouillon with multiple micronutrients could substantially reduce nutrient deficiencies (Adams, Vosti, et al. 2024).

Institutional and Stakeholder Landscape

Senegal's LSFF efforts are guided by a robust set of institutional structures and a dense network of stakeholders. Figure 1 distinguishes between government agencies and ministries, private sector actors in the wheat milling, oil refining, and salt industries, research and academic landscape, civil society members, and key donors and technical partners. Figure 1 also indicates relationships amongst these actors where relevant, including reporting lines, those who exercise sanction and surveillance functions, those that are technical arms, and those that play a convening role. Each of these details are discussed in greater detail below.

Figure 1: Institutional Landscape for LSFF in Senegal



Government actors

There are three key ministries that play an important role in LSFF. Primary amongst these is the Ministry of Industry and Trade (MIC), which has several functions. The Director of MIC's Department of Industrial Redeployment (DRI) is the president and co-convenor of COSFAM who helps facilitate meetings of that body. MIC's Directorate of Internal Trade (DCI), and the Division of Consumption and Consumer Safety (DCSC), are the main sources of oversight and surveillance of industry compliance with LSFF mandates. While DCI focuses on iodized salt compliance, DCSC is responsible for fortified oil and wheat flour (KII1; TechnoServe 2023). Their responsibilities encompass inspection visits to factories, production areas, and border areas. The Ministry also has offices in the country's 14 regions and 46 administrative departments, which also play a role in surveillance activities (KII1).[6] Surveillance agents will utilize qualitative WYD and i-Check machines to confirm compliance. They will often work with the gendarmerie, police, and customs agents for testing as well, especially along transport routes and at the borders (KII5). More detailed tests will be sent to the National Laboratory for Analysis and Control (LANAC), which is the autonomous national reference laboratory for food control in Senegal also overseen by the DCI (KII6).

The Senegalese Standards Agency (ASN) is an autonomous body that is responsible for issuing LSFF standards. The ASN is led by a 10-member board of directors, inclusive of four government representatives from the office of the presidency, and the ministries of finance, commerce, and industry (Sylla 2021). The ASN has three key mandates, which include elaborating standards at the national level and representing Senegal's position on standards at the regional and international level. A second mandate is to sensitize and train relevant stakeholders about the standards while the third is to issue certifications to businesses that have met all the conditions, including the microbiological and physical-chemical characteristics, for applying a standard (KII9).

Although the Ministry of Health is a central actor in shaping and overseeing nutrition policy in Senegal, it is secondary to LSFF policy implementation and oversight. However, as discussed later, the Ministry actively engages in LSFF policy discussions via COSFAM. The Ministry of Finance is not a specific member of CNDN or COSFAM, but it looms large in the discussions about LSFF due to the important role it plays in deciding on premix tariff rates.

As noted earlier, the CNDN is located in the Office of the Prime Minister, but its members include 12 sectorial ministries, including not just health, commerce and industry but also agriculture, decentralization, and the others indicated in Figure 1. The structure also has 1 representative from civil society and another from the local government (*collectivités locales)*.

COSFAM is the technical arm of the CNDN, with a specific mandate over debating and advancing technical discussions over LSFF. Due to historical reasons, however, CNDN has played a strong role in salt iodization while COSFAM primarily has concentrated on edible oil and wheat flour fortification (KII17). Along with the president from DRI, COSFAM also has a coordinator who is affiliated with the Institute of Food Technology (ITA) and who leads the drafting of reports and the

[6] Senegal is further divided into 557 communes (https://www.sng-wofi.org/country_profiles/senegal.html).

body's operational plans (KII7). COSFAM also has different technical bodies within it, including a nutrition technical committee that meets when nutrition and health data and analysis need to be discussed (KII20) and a national technical committee on bouillon (KII13).

Industry and market structure

The most relevant industry actors include those in the salt, edible oil, and wheat flour sectors whose market structures are described in Table 3. Senegal is the largest producer of salt in West Africa and a net exporter of the condiment, primarily to Côte d'Ivoire, Mali, Burkina Faso, and Benin (GIZ 2022). Recent estimates suggest that the country produces about 550,000 tons a year (GIZ 2022) and exports between 60-80 percent of salt with the remainder consumed locally via table salt, through food processing, bouillon cube manufacturing, livestock feed, or for other needs (Technoserve 2023). However, the industry is quite diverse. The largest salt washer and refiner is *Société Nouvelles des Salins du Sine Saloum* (SSS), which operates large salt marshes in the Kaolack region (TechnoServe 2023). About 40 percent of production is done by artisanal salt miners with key production areas being Casamance, Lac Rose in Dakar, Fatick, and Saint-Louis (TechnoServe 2023); Lac Rose alone produces more than 10% of Senegal's salt and employs directly approximately 3000 people (KII19).[7] Imports of refined salt, largely from Turkey and Tunisia, grew between 2014-2019 but have since fallen to only about 5,000 tons as of 2021 (GIZ 2022). Then there are several companies, such as PATISEN and SENICO, that utilize salt for other agro-industries. In 2024, these companies had to import salt from Egypt due to a lower supply but in 2025, all salt is being sourced domestically (KII2).

Compliance with vitamin A fortification for oil is viewed as one of the biggest challenges in Senegal (KII6, 21). Senegal's current standards mandate that all edible oil should be fortified. Historically, the country had an advantage in peanut oil production. However, since it gains larger profits elsewhere, a majority of peanut oil produced in Senegal is exported and instead, domestic consumption is disproportionately skewed towards palm oil and soybean oil imported from Southeast Asia and South America, respectively (Mbaye, Golub, and English 2018; TechnoServe 2023). In addition, a great deal of oil is also smuggled from neighboring Gambia and Mauritania, where oil fortification is not mandated, making oversight much more challenging (KII21).[8] One study suggests that there are more than 40 brands of oil in the market, some of which lack labels in French or Wolof (TechnoServe 2023).

Senegal imports all its wheat but domestically processes almost all its wheat flour, producing around 580,000 metric tons as of 2022 (Technoserve 2023). There are six main milling companies (see Table 3), some of which have been in the country for decades. Compared with salt

[7] The sector is still recovering from heavy rains in 2022 that caused Lac Rose to flood and interrupted salt harvesting (Africanews 2022). This, in turn, has impacted domestic supply and the price of salt (KII1), which is why more salt has had to be imported recently, increasing from 5,000 to 11,000 tons of imports between 2021 and 2023 (See Table 2). The process of extracting salt from Lac Rose is different than in other parts of Senegal because the salt crystalizes at the bottom of the water while elsewhere, they gather the salt after surface water evaporates (KII19).

[8] Golub and Mbaye (2009) uncover high levels of smuggling between Gambia and Senegal.

and edible oil, wheat flour is a much more competitive sector. The advantage of a medium number of large-scale wheat mills is that the control of wheat flour fortification is relatively easy, and authorities note that it is very rare to find that wheat flour does not conform to the iron standards for fortification (KII5), though, as discussed later, folic acid compliance is much lower. However, the wheat flour standard is not well-understood, and while it is supposed to be applied to include all "soft wheat flour," often only bakery flour is fortified. Consequently, flours used for pastries or biscuits are not fortified, nor is flour for the traditional tapa-lapa bread that is consumed by lower-income Senegalese (KII 18; TechnoServe 2023).

Table 3: Overview of market structures for fortified food vehicles in Senegal

Industry	Imports	Exports	Domestic consumption	Companies (market shares)
Salt	Approximately 11,000 tons in 2023	60-80% of production	Approximately 98% of households	**Industrial transformers:** Société Nouvelles des Salins du Sine Saloum (50%) **Semi-industrial:** Sel Sine, Sel du Saloum, Comptoir du Sel **Refiners and packagers for other industries:** PATISEN, SENICO **Artisanal producers** (about 40%)
Edible oil	Almost 95% of the total edible oil market	About $15 million in groundnut oil in 2023	Approximately 90% of households	**Refiners of imported unrefined oil** SENICO (23-27%), SONACOS (15-25%), Oleosin (8-12%), **Importers of refined oil** (35-40%); **Artisanal peanut oi**l (5%)
Wheat flour	Negligible	About 15,000 metric tons per year	Approximately 89% of households	**Industrial millers:** Grands Moulins de Dakar (36%), Nouvelle Minoterie Africaine (14%), SEDIMA (9%), Four du Khalife Sénégal (FKS)(21%), OLAM (15%), Les Moulins du Sénégal (MDS) (5%)
Rice	About 60% of consumption	Negligible	Approximately 96% of households	**Industrial mills :**13% of locally processed rice **Artisanal mills:** 87% of locally processed rice

Industry	Imports	Exports	Domestic consumption	Companies (market shares)
Bouillon	About 90% of consumption	About 40% of production[b]	Approximately 90 % of households	**Industrial producers:** GB Foods, Nestlé, Patisen, Promasidor, Senico, Unilever

Sources: Adams et al. (2024) ; GIZ (2022); OEC (2025); Technoserve (2023); Vosti (2024) ; WFP & NI (2019)
Notes: *There was a seventh miller, Minoterie Basmala, that seems to have stopped its activities (KII23). [a] Importers include SENAME SARL, AMS Industries, and Société de Conserverie en Afrique SA.
[b]This share is based on Patisen's reported export shares. There is also some re-export of imported cubes, especially Maggi and Knorr from Nestlé and Unilever, respectively.

Overall, the market structure dynamics highlighted above, and the nature of the micronutrients targeted at particular food vehicles, partially account for differing compliance with LSFF standards. Oversight of compliance for wheat flour fortification, especially iron, is quite high since almost all wheat flour is domestically processed, and milling is dominated by large-scale companies. In fact, a study of compliance based on market samples in Dakar and Thiès found that over 80 percent of domestically-produced wheat flour was iron-fortified (Faye et al. 2025). By contrast, a large share of edible oil, both refined and unrefined, is imported, and this requires greater oversight of the borders. Vitamin A is also quite vulnerable to exposure to sunlight, requiring careful attention to packaging (KII23). While most salt is domestically sourced, a significant share of that salt is from artisanal producers who may lack the training and equipment to properly clean and iodize it.

Rice is not currently part of Senegal's mandatory fortification standards, but there are efforts underway to determine its viability as an additional food vehicle. Like bread, rice is widely consumed in Senegal but, despite programs intended to bolster rice yields, domestic production cannot keep up with demand. As a result, the country imports 60 percent of its rice supply (WFP & NI 2019). Between the Senegalese River Valley and the Casamance region, there are over 40 industrial rice mills with mechanized services (Sylla 2025). In addition, there are semi-industrial mills, including the Senegalese Food Industry (SFA), that buy rice paddy from smallholders via contract farming (IISD, ADA. and SSNUP 2024). There are also more than 700 small-scale producers that account for the majority of locally processed rice (TechnoServe 2023; WFP & NI 2019). Rice fortification efforts are currently occurring through pilot programs using fortified rice kernels (FRKs). Since 2020, WFP has been piloting this in Matam region within school feeding programs (WFP & NI 2019). More recently, WFP has been working with the ASN and a farm equipment supplier, Agritech, to support rice mills in the south of the country, particular in Sédhiou region and upgrading blenders used by SFA for fortification efforts in the north (WFP 2025). Rice remains a priority for the government, and Faye's administration launched a Food Sovereignty Strategy (2025-2034) that places rice, along with wheat and maize, as targeted crops for self-sufficiency (Sylla 2025).

Finally, many companies currently voluntarily fortify bouillon and while they all include iodized salt, they add different types of other micronutrients. Bouillon production remains overwhelmingly dominated by multinational companies, such as GB Foods, Nestlé, and Unilever. Since 2008, GB Foods has been fortifying its West African bouillon with vitamin A and started

producing these cubes under the Jumbo brand in Senegal in 2015 (KII25). Nestlé's began fortifying its Maggi brand with iron in 2013 (APS 2013), and Unilever is also fortifying its Knorr brand with iron at low levels (KII25). Patisen produces several locate brands of bouillon, including the increasingly popular Adja brand (Lo 2021). Patisen has aimed to reduce the amount of MSG in its cubes, and it is a major Senegalese exporter of bouillon to other West African countries such as Nigeria (Diallo 2018). Currently though, it only fortifies with iodized salt (KII26). The packaging for Senico's Kadi brand claims that it is fortified with not only iodized salt and iron but also vitamin A and folic acid.[9] A national mandate would allow for more consistency in the type and level of micronutrients used across companies.

Civil society

Senegal's tradition of political pluralism and openness means that there is a robust civil society community, including both NGOs and academia. One study identified 29 CSOs that were relevant to LSFF, with many being viewed as trusted partners and a key connection between government and local communities (TechnoServe 2023). Three key non-governmental organizations (NGOs) that are part of COSFAM include the Consumer Association of Senegal (ASCOSEN), EcoCitoyen, and the National Union of Senegalese Consumers (UNCS). Besides ITA, which plays a central role as a co-convenor of COSFAM, the University of Cheikh Anta Diop (UCAD) has had a specialized public nutrition program since the late 1990s (Fox 2018). It has also conducted several studies on fortified rice, fortified flour, and vitamin A levels at factory levels (TechnoServe 2023) in addition to subnational surveys on micronutrient status. The University of Gaston-Berger (UGB) in Saint Louis also conducts various tests on vitamin A fortification in oil and iodine (KII20) while the Pasteur Institute operates laboratories for food safety and quality testing.

Donors and technical partners

Due to their long-term involvement in LSFF in Senegal, Helen Keller International (HKI), Nutrition International (NI), and UNICEF are viewed as COSFAM's main technical partners (KII7). NI and UNICEF are major players in supporting salt iodization among artisanal producers. Since 2006, when the CNDN launched its Universal Salt Iodization Project (PIUS), NI has been providing training and equipment to small-scale producers as well as supporting the establishment of a central purchasing office to ensure producers have access to potassium iodate premix (NI 2023). NI also is a key partner for DCI over the last six years, working with the Division to engage in microplanning exercises to determine how and where they should prioritize visits by agents to test for iodized salt (KII1). Consistent technical assistance by NI within the DCI over that period has been an asset when there has been government turnover (KII1). NI has also provided funding for a digital platform that enables agents to enter the data they collect from production, wholesale, and retail sites (KII1). UNICEF has been providing iodine test kits at the community level (Seiler et al. 2023).

HKI has a long history working in Senegal, with an initial program from 2008-2014. Recently, its efforts have been revamped in the country where they are primarily concentrating on edible oil

[9] See https://senico-sa.com/product/bouillon-kadi-epices/.

fortification, including supply tests and reagents for vitamin A to LANAC (KII21). In addition, since 2019, HKI has been collaborating with several universities and COSFAM to explore the potential of voluntary bouillon fortification (KII21). Another important partner, Catholic Relief Services (CRS), has also been helping with the supply of iCheck test kits and working with COSFAM on a strategy to lobby the government for a removal of the taxes on premix imports (KII21). An earlier partner, GAIN, now plays less of a role in Senegal, though it has recently assisted with training with salt cooperatives on how to use iCheck machines (KII18). As noted earlier, WFP is primarily responsible for the rice fortification pilots in school feeding programs.[10] Finally, the Gates Foundation has supported several technical studies of micronutrient deficiencies, such as Wegmüller et al. (2025).

Methodology

To identify strengths and priorities for enhancing LSFF investments in Senegal, the Political Economy Diagnostic for Large-Scale Food Fortification (PEDAL) considers both the dimensions of political will and implementation capacity. Political will is defined as "the extent of committed support among key decision makers for a particular policy solution to a particular problem" (Post, Raile, and Raile 2010, 659). Such decision makers are primarily the public sector but for LSFF, require the concurrence of the private sector and civil society as well for successful uptake. The domains for political will in PEDAL consider whether interests are aligned amongst and between these three broad constituency groups, whether ideological factors support LSFF uptake, and whether these actors have sufficient leverage to convey their preferences.

While the political will component tracks how conflicts or agreement among different stakeholder categories can impact alignment and uptake of LSFF policies, implementation capacity assesses whether the needed range of institutional coordination modalities, technical skills and equipment, and human resources exist to ensure high levels of fortification adherence. In PEDAL, implementation capacity consists of two domains—institutional architecture and technical requisites—that consist of three components each.

The specific components that belong to the domains under political will and implementation capacity are shown in Figure 2. For each component, scoring occurs on a 1 (lowest) to 3 (highest) scale, and the correspondence between the coding and the operationalization is presented in Appendix 2. It is possible to have 0.5 intervals between 1 and 3 when there are notable variations across food vehicles. For instance, there may be differences in the assessment because of controversy around a food vehicle, the specificities of the micronutrients targeted at those food vehicles, or variations in the way the food industry for that vehicle is organized. The scorings are then translated into a traffic light scorecard ranging from red (scores of 1, indicating a major area of concern), yellow (scores of 2, indicating an area with some promise but needs strengthening), to green (score of 3, which is a source of strength for LSFF that could be leveraged). Scores at the 0.5 intervals receive a lighter shading. The primary data to

[10] Until early 2025, USAID was also a major donor via its Advancing Food Fortification Opportunities to Reinforce Diets (USAID AFFORD) program in Senegal.

support the coding is from the 26 interviews mentioned earlier that were conducted with informed stakeholders. The interview transcripts were coded in NVivo according to the components of PEDAL. The final coding for PEDAL was also supplemented with secondary materials.

Figure 2: Dimensions of PEDAL

		Public Sector	Private Sector	Civil Society
Political Will	Interests	Maximize financial ownership	Maximize profit margins	Minimize food costs
		Minimize backlash from important constituencies	Minimize organoleptic changes	Maximize nutrition
		Maximize citizen well-being	Maximize reputational branding	Minimize health risks
	Ideas	State vs. market	State vs. market	State vs. market
	Leverage	Policymaker cohesion	Industry associations	Coalition alignment
		Sanctions	Strike potential	Public awareness campaigns
		Incentives	Lobbying power	Buying power
Implementation Capacity	Institutional architecture	Modalities for coordinating multisectoral policies	Modalities for coordinating across industries	Modalities for coordinating across CSOs
		Horizontal and vertical regulatory coordination	Modalities for industry agglomeration	Geographical reach of CSOs
		Forums for issue articulation with private sector & civil society	Forums for issue articulation with public sector & civil society	Forums for issue articulation with public & private sector
	Technical requisites	Data for tracking consumption	Capacity for internal compliance testing	Capacity to assist with M&E
		Laboratories for monitoring compliance	Training on dosifier usage	Capacity to train private sector
		Trained and incentivized bureaucrats to monitor compliance	Training on storage of micronutrients and/or proper retailing of fortified foods	Capacity to train public administration

Findings: Political Will

Interests

Political will foremost depends on meeting certain assumptions about motivating interests. Interests often predominate in many policy decisions because individuals and groups seek to maximize some source of utility—whether profits, costs, votes, prestige, visibility—based on their position in the economy, society, or political arena. For LSFF, the literature shows that there are several different interests that stakeholders prioritize and when these are aligned, the uptake of LSFF is more realistic. The public sector, for instance, will want to maximize financial ownership since starting an LSFF program without continuous resources to support it can lead to volatility and a lack of trust by all involved stakeholders (Lalani, Ndegwa, and Bennett 2020; Tewes-Gradl, Gilbert, and Nelson 2023). For LSFF, there are many sources where financial sustainability is needed, including for funding institutional bodies to maintain policy momentum, providing needed testing equipment (e.g. iCheck devices and reagents, etc.), and paying civil servants for surveillance activities. Besides expenditures of public resources, governments can also be concerned about minimizing backlash from important constituencies, including businesses and very vocal civil society groups, who may oppose LSFF on either financial grounds or based on concerns about health risks (Lawrence 2013). At the same time, it can be assumed that the government is vested in maximizing citizen's well-being via improved nutrition and LSFF.

The private sector equally has multiple interests. Among these include maximizing profit margins, which requires minimizing costs around input access as well as for equipment and storage. In addition, it wants to maximize consumer demand for its products by ensuring minimal changes in organoleptic properties of fortified foods, and maximize reputational branding if there are benefits to cultivating a niche as a "nutritious foods" supplier.

Civil society actors, ranging from advocacy groups, service delivery NGOs, and academia, play a pivotal role in LSFF policy. Although this is not a homogenous group, civil society actors typically want to ensure that fortification still results in affordable food that maximizes nutrition while minimizing health risks (Hodge 2014). In some cases, LSFF may be dismissed as a "techno-food" fix that undermines efforts at expanding dietary diversity (Nestle 2013) while in others, it is widely accepted.

Public sector

The range of budgetary pressures faced by the Senegalese government, along with the concurrent reduction in donor resources, threatens the financial sustainability of LSFF. For several years, CNDN has had a budget line, but it has not been receiving its full disbursement from the Ministry of Finance (KII17). Between 2014-2019, COSFAM received a budget of about 100 million CFA per year from the government, but there has not been any budget since then (KII7; KII10). Moreover, several respondents highlighted that as soon as a donor project ends, there is regression in terms of compliance with LSFF (KII4, 5, 7, 17, 19, 21). One representative of the public sector noted, "The actions that we do in the area of fortification, generally, it's the financial partners who

support us since the beginning with the implementation of the iodine units, monitoring, control systems, all of that that was supported by financial partners…thus, if the project ends, effectively, they will stop it [fortification]" (KII5). As one respondent observed, "The support of the state is a bit weak. Senegal produces 500,000 tons of salt a year and the state is not really implicated in the sector. Without the donors and the technical partners, it would really be a catastrophe" (KII19).

There are important implications of this dynamic; several respondents expressed that as the LSFF agenda becomes increasingly reliant on donor support, it is also becoming more fractured due to the range of donor interests, including around bouillon and rice, even as efforts around salt and edible oil remain insufficient (KII1, 7, 20, 21). Others noted that there would be a real threat to control and surveillance activities if there were further cuts by partners who are pivotal in providing reagents, iCheck instruments and even technical guidance on where to target surveillance activities (KII1, 10).

While financial sustainability is a looming threat to LSFF, the country's long history with LSFF means that the intervention is broadly accepted by both business and civil society (KII7) and therefore minimal concern about the backlash to this policy. Among artisanal salt producers, fortification helped increase the monetary value of salt and generates more jobs (KII19). In wheat flour, millers noted that it was their social responsibility to support LSFF: "The millers consider that this [fortification] is part of their contribution. Thus, the fight against malnutrition is, for them, a social investment" (KII23).

At the same time, the government is vested in maximizing citizen's well-being via improved nutrition and LSFF, and this is evident in several ways. For instance, as noted earlier, LSFF as a mechanism to combat malnutrition is well-embedded in the country's nutrition policy frameworks, and Senegal has now launched its third fortification strategy. Moreover, nutrition is one of the primary functions devolved to the country's 46 local governments, who also play a role in LSFF surveillance (discussed later), thereby ensuring that there is policy coherence between Senegal's decentralization and nutrition strategies.

Private sector

For the private sector, which encompasses the broad set of enterprises for currently mandated vehicles (wheat flour, refined oil, and salt) as well as possible additional vehicles (rice, bouillon), one of the main interests to consider is how to maximize profit margins while pursuing fortification. In this regard, many unsupported costs were discussed by industry actors.

The costing landscape for the private sector has shifted over time and varies across industries. At the beginning of fortification, COSFAM along with various technical partners facilitated access to different premix inputs through either subsidies or via centralized purchasing (KII21). Yet, when donor projects ended, this support ended. Since fortification is mandatory, companies face penalties if they do not purchase the needed inputs. But, the cost of premix has increased in recent years, even in the absence of taxes (KII5). In the salt industry, despite the existence of a central buying mechanism in Fatick, Kaolack, and Rufisque, the cost of potassium

iodide has risen to 40,000 CFA per kilo compared with 30,000 CFA in 2023 (KII2).[11] These rising costs are likely partly responsible for the declining household coverage of iodized salt identified by Wegmüller et al. (2025), especially in poorer parts of the country.[12] According to one report on artisanal salt production in Fatick, it costs 50CFA per 25kg sack to iodize salt, or 2000 CFA per ton (GIZ 2022). In the wheat flour industry, the rising costs of the premixes are causing the private sector to make their own mixture from iron and folic acid (KII15, 18, 21). Folic acid in particular is very costly, with millers spending up to 70,000 CFA per kilogram (KII14). By contrast, within edible oil, it was noted that the cost of fortification only added about 6 or 7 extra CFA per liter of edible oil (KII16). For bouillon, Vosti et al. (2024) estimate that in Senegal, the premix cost per metric ton of bouillon cubes, inclusive of shipping and taxes, is around $335. In addition, the estimated average start-up costs for domestic factories, inclusive of testing and feeder equipment, VAT, labeling and training costs, are $24,752; since many of these are sunk costs, they would go down over time. Domestic producers are concerned about the costs because they note that these estimates ignore the costs of other ingredients and transport (KII26). Multinational representatives have conveyed less concern about costs (KII25) because they are already fortifying with at least one micronutrient and therefore have much of the required dosing and testing equipment.

Access to raw materials is a constant concern in the different industries. Industrial salt fortifiers claim domestic salt is low quality and they have had to import in some years, which increases costs (KII2). For large industrial companies with advanced fortification equipment, the amortization for that equipment and maintenance costs need to be built into their annual costs, as does the personnel to operate it (KII16). As discussed later, reagent costs for testing are also rising, with few wheat flour industries ever able to test for folic acid (KII16, 18). Since the government does not purchase reagents and donors are increasingly cash-strapped, the sustainability of sourcing these products is a growing concern (KII21). Despite the range of costs confronted, no private sector actors claimed these costs cause them to actively resist fortifying.

Beyond profit maximization, two other interests of the private sector include minimizing changes to organoleptic properties and maximizing reputational branding. For the former, no private sector respondent claimed that this was a binding constraint, but some millers did highlight that there is a delicate process by which the flour enzymes can be affected by iron sulfate if they are not sufficiently "coated"; if the enzymes are killed, then the quality and taste of the flour is impacted (KII15). The main concern about organoleptic property changes would be bouillon and for rice fortification, especially if there is a change in taste that impacts national dishes, such as *thiéboudienne* (KII13). Yet, since the rice fortification is still in piloting, this has not become a concern. For bouillon, there is concern about adding too much iron since it changes the taste and color and darkens the product during its shelf life and after cooking (KII25).

[11] 1 USD is approximately 567 CFA.

[12] Moreover, there are low iodine rates in the artisanal communities that produce iodized salt (CLM 2018; KII1).

With regards to reputational branding, no respondent claimed that they saw fortification providing them with an added niche in the market, likely because mandatory fortification has been in place for many decades. Importantly, much of the private sector subscribes to the importance of LSFF (KII7). Since it is mandatory, most industrial producers have accepted doing it and try as best as possible to build it into their cost structures (KII16). In fact, some try to test their competitors' products in the market to confirm it is fortified or otherwise report it to the authorities (KII16). As one miller noted, "We know that fortification helps in fighting micronutrient deficiencies and all… Thus, we have our role to play against malnutrition" (KII14).

Civil society

As noted earlier, there are three main consumer organizations—Ascosen, UNCS, and Ecocitoyen—that are part of COSFAM and several universities, including Cheikh Anta Diop and University of Gaston Berger, that are very supportive of fortification as a modality of maximizing nutrition (KII12, 13, 20); those interviewed did not express a concern that fortified foods were too costly for consumers.

In addition, there were no expressed concerns about the safety of fortifying foods, but there are several concerns amongst this community regarding overconsumption of unhealthy foods that are fortified. Specifically, bouillon remains the main source of contention. Consumer organizations appear less concerned about overconsumption of salt and other additives from bouillon than nutrition academics and organizations like UNICEF (KII7, 13, 25, 26), which oppose using ultra-processed foods for fortification (KII25). Technical partners are well-aware that this remains a divisive topic (KII21). As one academic noted, "For example, if I take the example of bouillon fortification, I have attended 2 or 3 meetings where we have not practically advanced because people are not in agreement. So, we proceed like that [having meeting after meeting] with a lot of arguments" (KII20). One industrial actor suggested that the views of the public could be problematic for a mandatory standard, necessitating much more investment in changing perceptions: "The main issue is that this vehicle is decried…So we need to change the perception of it because even if it is fortified, I don't know if the average consumer will take it. Even if the standard is voluntary, with the situation as it is, with the level of information as it is, we, the industrialist, we don't want to add to our costs to only wind up with the same situation" (KII26).

There are also some concerns about rice fortification, namely whether fortifying rice with 12 micronutrients, as is often discussed, could lead to an overconsumption of some micronutrients among the population and result in an under targeting of key micronutrient deficiencies (KII20).

Ideas

Ideational views emphasize that preferences often rely on inter-subjective understandings about how the world works that derive from historical experience, cultural norms, and societal expectations. While there are several different types of ideas that are key for understanding support for or resistance to LSFF, PEDAL focuses specifically on different levels of acceptance of state intervention versus market forces within the food industry; both industry actors and consumers

may either welcome or resent intervention by the state in a way that alters market competition or infringes upon individuals' rights to choose what they consume (Ashraf 2025; Lawrence 2013). Such interventions may manifest in the form of trade restrictions, limitations on foreign exchange access, market interventions to maintain price controls, and integration of mandatory fortification requirements in the food supply.

Governments' approaches towards trade and macroeconomic policy play a fundamental role in LSFF. While more protectionist approaches can build up industry and create an impetus to fortify for some sectors that benefit from fortification mandates being used as non-tariff barriers (Blüthner and Vierck 2009; Resnick et al. 2018), it can also limit processors' access to raw materials that are not domestically available or of insufficient quality to fortify. Equally, macroeconomic policies, such as foreign exchange rationing or volatility, can often be a significant barrier for industry to access needed inputs for fortification.

Public sector

Senegal's government has implemented selective protectionist measures in the past to build up certain industries, including for onion and tomato. For LSFF, the most relevant trade efforts would relate to efforts to build up domestic rice production, which is a longstanding policy goal and, as noted earlier, is a target of the new Food Sovereignty Strategy. Any mandates on fortified rice could create a bottleneck for domestic rice production goals, especially since the structure of Senegal's rice industry is very fragmented and therefore, it would be easier to import fortified rice from Asia (KII17). Nevertheless, Senegal has a relatively liberal trade and macroeconomic regime, and no respondents identified this as a deterrent to LSFF efforts.

Private sector

For the private sector, two ideational factors include whether they favor more government price intervention or a more liberalized system, and whether they favor restrictive trade policies over more open ones, especially if the former may help keep out foreign imports. The preferences for these types of interventions will depend on an industry's domestic comparative advantage, and they will necessarily vary according to food vehicles. On the one hand, the country's trade policies are relatively stable for the three main fortified vehicles, and no respondent from the private sector mentioned that these were a concern to their industrial growth.[13]

On the other hand, with respect to state intervention on prices, the main concern is by the wheat flour sector. Due to an electoral campaign promise of the new government, a price ceiling has been imposed on bread to ensure consumer affordability of this politically sensitive product. Currently, to make bread more affordable, the government reduced the price of bread from 175 CFA to 150 CFA and this, in turn, reduced the ceiling price that wheat flour can be sold from 19,200 CFA to 15,200 CFA per kg bag, requiring the millers to reduce their prices by 4000 CFA. To get to this

[13] Senegal does have periodic trade bans on other types of commodities, such as tomatoes, onions, and chicken.

price, the government waived value-added taxes and customs fees on wheat imports, but it still requires the millers to absorb the remaining 1000 CFA difference (KII15; 23).

The millers oppose the policy for several reasons. First, they observe that there are other costs to making bread beyond flour, including electricity, water, salt, and labor, and those are often the major source of inflation for bakeries (KII15, 16). Second, they note that they are not reimbursed by the state for transport costs of distributing their flour across the country: "We pay for transport and that price varies. For example, if you go to Ziguinchor, you are going to pay almost 800,000 CFA per truck…that should impact the price of flour. But the state says to you that the price that you sell from the factory [in Dakar] should be the same price that you sell in Ziguinchor" (KII15).[14]

Civil society

An ideational perspective relevant to civil society is whether the state should intervene in the food supply—and in fact has a responsibility to do so—or whether doing so amounts to overstepping by the state. In the latter perspective, mandated fortification is tantamount to state overreach that limits both consumer and producer freedom (Bell et al. 2024; Kurpad et al. 2021). Yet, there was no expressed opposition to state intervention to support mandatory LSFF by the civil society actors who were interviewed.

Leverage

Leverage refers to an actor's power to negotiate and bargain, which may derive from their size and organizational power, veto power within the policy arena, monetary influence, and/or voting size. There are several ways in which leverage in the LSFF policy process can manifest across different stakeholders. In the public sector, greater cohesion on LSFF among key ministries and policymakers on the objectives and priorities for LSFF provides more leverage when engaging with the private and civil society sectors. The public sector can also exert leverage through the judicious use of sanctions and incentives. Sanctions may include fines, suspension of operating licenses, and factory closures while incentives include subsidies for premixes or tax breaks for equipment. Private industry actors can likewise exert leverage over the design of LSFF mandates through their strike potential, industrial associations, and levels of coordination. The efficacy of these different tools of leverage depends on their structural power based on market concentration vis-à-vis the particular food commodity. Civil society's leverage derives from alignment among coalitions of civil society actors, sometimes bolstered through transnational networks. They may employ academic research and data and utilize access to the media to engage in consumer awareness campaigns that either support or oppose LSFF. Moreover, consumers can exert their buying power to

[14] Another area where there is state intervention in the market is the wheat flour quota system that the government introduced to avoid intense competition among millers. This policy originated from the arrival of the multinational Olam in 2014 and the expansion of the local company Sedima from animal feed into wheat flour. This disrupted the market, creating oversupply and intense price competition that ultimately forced the government to intervene with its quota system (Marot 2014). Yet, while the quota system remains, it does not seem to be a major source of concern by the millers.

demonstrate their positioning, including through boycotts or by shifting to informal market outlets to purchase smaller quantities or cheaper, smuggled staples when fortified foods are too costly.

Public sector

In Senegal, a threat to public sector cohesion relates to whether it is worthwhile to pursue bouillon fortification. The condiment has been considered for more than ten years a potential vehicle (Touaoro and Ndiaye 2022). Those from the Ministry of Health, CNDN, and those with a background in nutrition are very much opposed to adopting bouillon due to the presence of salt and glutamate within the condiment while those in MIC did not express this concern (KII3, 7, 17, 21, 24). A recent study showed that only 15 percent of the salt consumed by Senegalese derives from bouillon with the remainder from direct table salt, bread, and processed foods (Adams, Vosti, et al. 2024). Yet, some opposing stakeholders are still suggesting that more evidence is needed to decide on a standard for fortifying bouillon (KII3,7,17, 24).[15] A decision to fortify bouillon would also contradict the government's policy in 2021 to impose a tax of 25 percent on bouillon cubes to discourage salt consumption (Strauss 2021). Another source of contention is whether bouillon, or even rice fortification, will lead to certain populations overconsuming certain nutrients (KII10; Lassen-Wigger et al. 2018).

The government's use of sanctions has been an important mechanism of LSFF compliance. Heavy sanctions and unannounced visits to factories or wholesale markets were mentioned by multiple respondents. For salt iodization, many of the visits are focused on the artisanal producers rather than the larger companies that supply salt to bakeries or other manufacturers (KII2, 6). The testing may occur by the gendarmerie, the police, and/or the departmental offices of the DCI (KII1), and visits may occur as frequently as up to twice a week (KII19). The consequences for non-compliance include seizing and destroying the products, issuing a fine, and in some extreme cases, there is a risk of closing down a factory or even imprisonment (KII16). As one respondent in the salt sector noted, "Some [producers] have to pay 300,000 CFA per truck and that is to discourage people from not iodizing. It's a very good method, it works very well because people prefer to iodize than to pay the fines" (KII19). For large edible oil companies, the visits are more infrequent, around one or two times a year (KII16). For major wheat flour companies, the visits are six to seven times a year, with no predictability, and sanction fees can range from one to 100 million CFA depending on the scale of the offence (KII14).

By contrast, there are few incentives provided by the public sector to encourage fortification. In particular, the main source of grievance by the private sector concerns taxes on the import of premix (KII4,5, 7, 10, 11, 14, 16, 17, 21). All the micronutrients need to be imported into the country, with vitamin A often imported from Germany and France (KII16), and premixes for wheat flour coming from China, France, or India (KII15). One respondent noted that there was a 30 percent tax for potassium iodide (KII17).

[15] Notably, technical partners with a regional perspective have observed that the bouillon issue seems more controversial in countries such as Senegal than in Nigeria, where a Code of Practice for bouillon recently was adopted, or in Ghana (KII21).

Led by COSFAM and CNDN with support from MIC, a lobbying document has been drafted on the topic of premix taxes, and efforts are underway to consider how to operationalize strategic entrypoints to remove these taxes (KII16, 17, 21). This currently is under consideration of parliamentarians in the National Assembly since removing the taxes would involve passing a law to amend the *Code fonctionnel des impôts*. (KII5). As one respondent noted, "We all have an interest that the tax on these premixes is removed" (KII22) while another observed the following: "Senegal doesn't make micronutrients. These products are imported. Thus, since these products are imported, it's the role of the State to do everything to facilitate access to industries to these micronutrients because they are obligated to fortify wheat flour, oil, and salt" (KII5). However, given that both the president and the prime minister previously worked in tax administration, and due to the country's macroeconomic situation, there is some skepticism that the lobbying efforts will go very far domestically and therefore, some reflection on how lobbying can be more effective at the at the ECOWAS level (KII7).

Private sector

The scale of industry coordination is reflected in how well the sector is represented by unions or associational bodies. In Senegal, there is a sizeable industrial organization for millers known as the Association of Senegalese Industrial Millers (AMIS), which was established in 2015 and includes the six millers listed in Table 3 (KII23).[16] Although there is a West African association for edible oil producers, known as AIFO-UEMOA, efforts to establish an edible oil association in Senegal have not been successful because there are very different interests among the industrial refiners and those that just import and bottle refined oil. However, there is growing interest among the larger refiners to more formally organize (KII23).

In terms of strike potential, the millers through AMIS have the most power in this regard, and they have threatened to use it in the past. For instance, in June 2024, when the government first announced it was reducing the price of bakery flour from 19,200 CFA to 15,200 CFA, the millers threatened to halt flour production, mobilizing Article 30 of Law no. 94-63 from 1994. This law prohibits companies from selling at a loss (Mbodji 2024). The same threat to halt production or delivery of flour also occurred in 2021 and 2022 (Cosset 2022; Mansaly 2021). Despite these threats, it does not appear that the state has relented in its pricing policy, with the millers still noting that they have not yet been reimbursed for the costs they have been forced to absorb (KII14). As one miller expressed, "We put up with the state. We put up with everything they do, even if we know it's not right sometimes, but we put up with it. It's [fortification] is expensive. They say it's compulsory. They reduce the sale price of [our] products, and we lose money…Normally, if we let the price work, we could finance these activities with what we earn. But when you reduce what we earn, it [fortification] is hard to finance" (KII15).

Due to Senegal's tradition of political openness and *assises nationales* (national conferences), there are opportunities for industry actors to lobby government partners on policy decisions, especially for salt and wheat flour. For instance, in 2023, there was a Business Forum in

[16] There was originally a seventh miller, Basara, but that company is no longer operational (KII23).

the Salt Industry (*Forum des Affaires dans l'Industrie du Sel,* FAIS) where the concerns of salt producers were openly discussed with policymakers and donor partners.[17] In the wheat flour sector, millers have frequent meetings with the government, particularly with the ministries of commerce and industry and more recently with the office of the Prime Minister (KII23). By contrast, the edible oil industry does not seem to have as much regular formal engagement with the government.

Civil society

Senegal's civil society has a variable degree of leverage. On the one hand, CSOs play a trusted role between local communities and state policies (TechnoServe 2023). Moreover, there are also strong networks between and among Senegalese academics and international nutrition academics who have worked closely on recent fortification studies (see Adams, Vosti, et al. 2024; Faye et al. 2025; Ndiaye et al. 2018). On the other hand, with respect to some food vehicles, there is contention among academics and between academics and CSOs. As noted above, this is particularly with respect to bouillon and rice.

Civil society actors also have an important degree of leverage with these other actors because they play a fundamental role in enhancing public awareness about LSFF. These organizations claim that the binding constraint to public awareness is not a lack of acceptability from the population but rather a concern that consumers do not know how to properly conserve fortified foods so that they do not lose their micronutrients (KII20). Moreover, many communities do not understand the meaning of the fortification logos on packaging (KII16). There are associations of nutrition professionals who are involved in informing populations about the benefits of purchasing fortified foods through television, radio, and social media. COSFAM has also worked with the three main consumer NGOs to engage in campaigns across the country who in turn conduct focus groups and workshops to help inform local populations about fortification advantages (KII7, 13). As one NGO representative noted,

> "The worry is ignorance. There is ignorance about micronutrient deficiencies and the illnesses that could be linked to these deficiencies… Investors, they produce publicity spots, inserts on the radio or on the television. You know in Senegal, the people prefer word of mouth. Sometimes, it escapes people when it comes from the television, they don't understand. That is why we, our organization, when we are in the regions raising awareness, we organize the people and groups" (KII13).

In addition, there are trainings with market vendors. One of the organizations, in partnership with NI, worked in 25 markets throughout Dakar to sensitize the vendors about the vitamins in wheat flour and worked with vendors in other regions to conserve their inventory of edible oil (KII13). For CSOs, however, the continuation of such campaigns is highly donor dependent since they receive no subsidies from the state and association fees from their members are quite low (e.g. 1000 CFA

[17] See https://www.fais-senegal.com/le-fais (access June 15, 2025).

per year); as such, at least one planned awareness raising campaign with artisanal salt producing areas never got off the ground (KII12,13).

This perspective highlights that a share of consumers are neither well-accustomed to buying fortified foods nor are they actively boycotting them. Instead, low awareness is the main challenge, especially among low-income groups. For instance, consumers in the artisanal salt producing regions have higher levels of iodine deficiency (KII1; CLM 2018). In border regions and within the remote interior of the country, another challenge is higher consumer access to non-fortified and even non-refined edible oil (KII16). Since refined oil, which is needed for fortification to be effective, is more expensive, this can prove a challenge for targeting lower-income communities.

Findings: Implementation capacity

Institutional architecture

Institutional architecture refers to the range of coordination mechanisms required to ensure coherent implementation of LSFF policy. This includes, for instance, horizontal coordination across multiple ministries and agencies that may each have different responsibilities, both direct and indirect, along the fortification value chain. Platforms to convey progress and problems with fortification implementation ensure that all affected stakeholders are informed and incorporated in the decision-making process. To that end, national fortification alliances that include government, industry, civil society, donors, and nutrition professionals to identify common points of (dis)agreement have been critical components of LSFF in many countries. If responsibilities for LSFF implementation and oversight are divided across different levels of government—such as states, provinces, regions, or cities—then vertical coordination mechanisms are also needed.

Coordinating across industries is particularly critical when a designated food vehicle is produced through many small- or medium-scale processors. In such cases, to make fortification more viable, opportunities to organize processors into larger groups that can supply to the market makes LSFF more affordable to industry actors as well as enhances monitoring, training, and oversight. Since the sustainability of LSFF and its ultimate impacts on human nutrition depend on having a stable supply of production and inputs, it is equally important for the private sector to have modalities of coordination along the value chain of the targeted food vehicle, particularly between farmers and processors as well as between industrial and retail food suppliers.

Civil society also needs to be coordinated to ensure coherent messages to the government and private sector; such coordination can be facilitated through network modalities such as the Scaling Up Nutrition (SUN) movement. Since monitoring compliance, conveying citizen concerns, or assisting with training requires a presence beyond the capital city, the credibility of such organizations and networks with national governments and the private sector to help with implementation also depends on their subnational geographical reach.

Public sector

The three components for public sector institutional architecture include modalities for coordinating multi-sectoral policies affecting LSFF, horizontal and vertical regulatory coordination, and forums for issue articulation with the private sector and civil society. As noted earlier, Senegal has a long history of advancing multisectoral policies on nutrition that incorporate LSFF as a key pillar. CNDN represents a pivotal mechanism for helping to coordinate nutrition concerns, and its traditional mandate over salt fortification provides a crucial link primarily between the ministries of health and trade but also with several of the other key ministries that are part of CNDN (see Figure 1). As one respondent noted, "It's really important for me to know that the CNDN is an instrument within the Prime Minister's office that is responsible for coordinating nutrition policy. And that the CNDN has good coordination, and a good presence in the field" (KII24).

Senegal also benefits from relatively clear differentiation of the major agencies responsible for policy development and regulatory oversight at both national and subnational levels. As noted earlier, MIC is well-recognized as being the lead agency for surveillance and regulation from the factory to the market level. Different administrations within MIC, namely DCI and DCSC, have oversight for salt and wheat flour/oil, respectively. Their well-established regional and departmental offices can allow for a broad regulatory presence on the ground, especially for salt, for which production and processing is the most decentralized. No respondents expressed confusion over who was in charge of enforcing LSFF.

Moreover, Senegal has a long history of consensual and participating forums for the exchange of ideas. This concept permeates COSFAM, which is broadly representative of different stakeholder interests. However, the challenge for COSFAM is that it is insufficiently staffed. There is no permanent secretariat with full-time staff devoted to COSFAM's mission. Instead, its leadership has other professional responsibilities, either through teaching at ITA or through the DRI (KII7, 10, 21). In addition, some note the composition of COSFAM needs to be expanded to include more technical participants, including technicians, biochemists, and engineers (KII1).

The difficult budgetary situation, compounded by the growing interest in alternative food vehicles, has raised concerns that COSFAM is losing its visibility and strategic vision, and therefore risks being pulled in incoherent directions by its partners to focus on the project objectives of those donors who have resources to pay for COSFAM meetings (KII7, 10, 13): "But it's necessary that we move towards what one calls the implementation of coherent interventions, coordination. This is to avoid that each one does his own thing. We are very open with the partners, but it's necessary that after finishing the validation of the third fortification strategy, there needs to be a coordination framework and better coherence of interventions" (KII10).

Private sector

For the private sector, components of institutional architecture include coordination across industries, which is particularly critical when a designated food vehicle is produced through a mixture of small- and medium-scale processors. In such cases, to make fortification more viable, opportunities to organize processors into larger groups that can supply the market make LSFF more

affordable to industry actors as well as enhance monitoring, training, and oversight. Since the sustainability of LSFF and its ultimate impacts on human nutrition depend on having a stable supply of production and inputs, it is equally important for the private sector to have modalities of coordination along the value chain of the targeted food vehicle, particularly between farmers and processors as well as between industrial and retail food suppliers.

In Senegal, the need for sustainable modalities of business agglomeration is most relevant for salt due to the large share of production and iodization conducted by artisanal producers (see Table 3). Small *groupements d'intérêt economique* (GIEs) have been organized among artisanal producers, sometimes under the umbrella of cooperatives (GIZ 2022). These largely have been initiated with support from partners such as NI, GIZ, and UNICEF (KII2). Over time, some of these, such as in the Lac Rose area, have improved their financial sustainability by centralizing funds across all the cooperatives into one account that allows them to buy potassium iodide in bulk format (KII19). In other regions, however, there have been tensions between villages that hinder cooperation among these entities, reducing incentives to work collectively to access the iodine and equipment needed for fortification (KII5).

There do not appear to be modalities for coordinating across the segments of the value chain. While this is not very relevant for wheat flour, it is more relevant for salt and edible oil where there are divisions between artisanal and industrial producers, as well as importers for the oil sector. These divisions generate concerns by industrial producers about the quality of raw materials they are using to fortify. In the salt sector, industrial users resent the quality of the salt they receive. Due to poor equipment and training, the quality of salt from the artisanal producers is substandard, creating large losses for buyers such as PATISEN and SENICO who need to re-wash, refine, iodize, and package the salt (KII2). Moreover, artisanal producers often superficially spray salt with iodine that might not be properly absorbed internally (KII2); when the larger processors re-wash the salt at their factories, the iodine disappears and therefore, they need to re-add new iodine (KII2). Consequently, for at least two years, the DCI has worked with the salt industry on a new decree that would allow industrial actors that use salt for butter, bouillon, and other products to purchase non-iodized salt that they can in turn iodize directly (KII1, 4,5).[18] In addition, many of the artisanal actors in the salt sector use unbranded and untraceable salt bags, making oversight more challenging (TechnoServe 2023). The other problem is labeling and packaging. The Manufacturing and Marketing Authorization (known by its French acronym, FRA) is exempted for small producers but major producers are required to get the FRA authorization (KII1).[19]

For edible oil, one of the challenges for industrial companies is that the edible oil they receive from artisanal producers from the interior of the country may not yet be refined, and non-refined oil cannot be fortified (KII16). Much of that oil, known as *Ségal*, is consumed locally but not fortified with vitamin A because it is not refined (KII16). Refined oil is more expensive than crude oil,

[18] There is some opposition to this decree by salt cooperatives who worry that this decree might lead some artisanal producers to avoid fortifying for non-industrial purposes, i.e. direct table salt (KII19).
[19] This authorization allows for the manufacture, processing, and packaging for sale of all products intended for human or animal consumption in Senegal and falls under the jurisdiction of DCI.

and the crude oil producers often recycle their packaging to charge lower costs; therefore, refined and fortified oil is unlikely to be purchased by poorer local communities (KII16). Since it is mainly produced in Touba, the center of the Mouride Sufi community that historically controlled the groundnut sector, the artisans traditionally have been able to push back against fortification due to their substantial political clout (KII16).[20]

Representatives from across the private sector, including representatives from both artisanal and industrial entities, mentioned participating in COSFAM meetings and appreciate the body's role in representing their interests (KII14,15, 16, 18, 19). Although the private sector does not lead or co-lead the body, the co-leadership role of COSFAM by MIC—which is largely seen as industry's main interlocutor with the government—ensures that there is a strong representation of their various interests.

Civil society

For civil society, a key component of institutional architecture is the existence of modalities for coordinating across CSOs and academia to avoid duplication or contradictions in LSFF activities. In Senegal, there are several different major civil society coordinating bodies that intersect on LSFF. These include the Scaling Up Nutrition (SUN) movement, which currently has 38 members and coordinated by the executive director of CNDN.[21] In addition, there is the Senegalese Federation of Consumer Associations that incorporates about a dozen consumer-oriented associations (KII12), and the Food and Nutrition Association of Senegal (ANAS) (KII20).

The geographical reach of some of these organizations is impressive, with some claiming they have activities ongoing in all 46 departments of the country (KII12, 13). As noted earlier, a research institute, ITA, co-leads COSFAM and thereby provides a useful research and nutrition lens to complement the business orientation of MIC. The three main CSOs (UNCS, Ascosen, and Ecocitoyen) are all important and recognized members of COSFAM (KII7), as are the University of Gaston Berger (UGB) and University of Cheikh Anta Diop (UCAD).

Technical requisites

Technical requisites for LSFF implementation encompass data, equipment, and training. For instance, the public sector requires the latest data about consumption behaviors to ensure that its micronutrient standards and food vehicles are appropriate. Equipment includes proper and sufficient laboratories to assess industry compliance as well as devices, such as iCheck, that can facilitate quality assurance internally within industries. Training is paramount for both frontline bureaucrats in charge of monitoring LSFF compliance, as well as industry actors that commit to fortification. For the former, this may involve attractive compensation, performance incentives for food control agencies to retain talent, and appropriate travel budgets. Technical training among

[20] The Mourides long have had a strong influence over Senegalese politics, and their stronghold of Touba has a high level of administrative autonomy from the central government compared to other localities (Ross and Guèye 2021).

[21] See Scaling Up Nutrition Senegal (Platform SUN) - SUN Civil Society Network.

industry actors may be needed about, *inter-alia*, the proper use of a dosifier and appropriate storage to maintain nutrient integrity. Civil society actors, such as domestic and international universities, can provide monitoring and evaluation, training to the private sector, and supplement capacities of the public administration.

Public sector

For the public sector, one of the most important dimensions for making LSFF policy is ensuring that there is up-to-date data on consumption patterns and micronutrient deficiencies to confirm that LSFF is working to address deficiencies and to identify how vehicles and standard levels and micronutrients might need to shift. In Senegal, for instance, despite some studies identifying deficiencies in zinc, the ASN cannot shift standards on zinc for vehicles such as wheat flour until it has more comprehensive and recent national survey data (KII9). Similarly, there is some concern that with more foods being fortified, it is not clear if there are possible overdoses of certain micronutrients (KII10). Senegal has not had such a survey in the last five years, with the most recent being the 2018-2019 harmonized survey on living conditions. While a demographic health survey occurred in 2023, it did not contain information on micronutrient deficiencies.

Another critical technical requisite for the public sector is the existence of certified laboratories for monitoring compliance. Senegal has the advantage of well-trained laboratory professionals (KII17) and several different laboratories as highlighted in Figure 1. LANAC, however, is the only laboratory accredited for vitamin A and iodine; nevertheless, this accreditation has expired and needs to be reactivated (KII6). No laboratory in the country currently tests for folic acid (KII6, 16, 17, 20, 21), requiring samples to be sent overseas to Switzerland (KII7). As one respondent noted, “This is a pity, it is really a gap” (KII7). The lack of reagents is another hurdle for LANAC, which prevents it from testing for many different types of vitamins (KII6). Donors are relied on heavily to purchase testing kits from overseas because otherwise, Senegal’s administrative rules require that 2 or 3 procurement sources are identified in advance of government purchases, creating a major delay in obtaining kits directly from trusted suppliers (KII7).

Bureaucratic resources represent another component for monitoring and evaluation of LSFF standards. As noted earlier, the surveillance, control, and sanctioning activities are overseen by MIC, particularly the DCI and the DCSC. They have approximately 100 agents and support through their commercial service wings in all 14 regions and all 46 departments (KII1), which is viewed as sufficient (KII21). The main weakness in terms of oversight and numbers is particularly at the borders where, as noted before, unfortified oil might be smuggled into the country (KII3, 20, 23). They will also work with the police and gendarmes to engage in random checks to ensure products are fortified (KII1, 5). This is especially the case for salt because it can be done with a rapid iCheck test on the spot while for oil and wheat flour, a sample needs to be taken and sent for testing

(KII5).[22] Yet, a particular complaint is that the stock of test kits is stored in Dakar and therefore, there are often limited quantities in other regions of the country (KII5).

MIC may have occasional training seminars with these agents to ensure they are aware of the standards and how to use the rapid test kits for iodine (KII5). Yet, there is a recognition that for the agents to stay motivated, they need for more financing for reagents and the test kits (KII1). The DCI can also track its agents in the regional and departmental offices through a data platform that pinpoints their geolocation to ensure they are visiting their designated sites of production or wholesalers to test for iodized salt (KII5).

Private sector

The technical requisites for the private sector to engage in LSFF involve internal compliance testing, dosing and processing fortified foods, and proper micronutrient storage. For internal testing for edible oil, large-scale enterprises are relatively well-equipped with their own laboratories, staff, and high-performance liquid chromatography (HPLC) devices (KII16). They also espouse alignment with the highest standards, noting that if even one lot of their stock does not conform with the designated norms, it is blocked from being marketed (KII16). For wheat flour, large-scale millers test their flour every day and typically at multiple points before it leaves their factories, including before packaging it, after removing it from their siloes and before putting it on trucks, and sometimes randomly from one of their trucks (KII15, 18). However, millers only have the capacity to test for iron using iCheck iron, and not folic acid (KII15,18). Most artisanal salt cooperatives also now have iCheck machines provided by GAIN to determine the presence of iodine in their salt (KII19). Yet for both the large-scale and artisanal salt producers, a lack of reagents poses a problem for using these test kits (KII2,5, 21).

With respect to dosing, there are two key challenges that face the private sector. First, as noted earlier, wheat flour millers are making their own premixes to combine iron and folic acid. They use an estimated approach based on comparing the amount of folic acid before production and then return to their stock after production to see if it aligns with the formula established for reaching the required standard (KII15). As one miller observed, “Technically, we don’t have the equipment to ascertain the presence or absence of folic acid. This is our weak point” (KII15). Second, the dosing abilities of artisanal producers, especially in salt, remain weak compared to their industrial counterparts, who also need to comply with the strict standards of the food processors who purchase their salt (TechnoServe 2023). By contrast, artisanal producers often do not have the correct dosing machinery, or the machinery they have received from technical parties has fallen into disrepair (KII4).

Finally, in terms of micronutrient storage and distribution, this seems most challenging for the artisanal salt industry because iodine degrades very easily, especially in sunlight, high humidity, and when transported across large distances (KII1). If not well packaged and stocked, salt can lose

[22] However, the labeling on oil bottles can be quickly checked to see if the sticker on the bottle indicates whether the oil is fortified (KII5).

its iodine content within three to four days (GIZ 2022). Consequently, it needs to be iodized often at every point before distribution (KII1). For edible oil, the volatility of vitamin A requires careful handling; however, the packaging behaviors of smaller-scale refiners can result in placing the oil in transparent bottles that cause a degeneration of the palmitate retinol due to sunlight exposure (KII5).

Civil society

Civil society can play a pivotal role in addressing capacity gaps that might exist in the public or private sector for fortification compliance. In Senegal, this is clearly a major asset for supporting rigorous M&E of fortification programs. Several academic bodies noted that they could support M&E impact evaluation by examining how, after all these years, the consumption of fortified foods is impacting health and micronutrient deficiencies (KII20). Another respondent noted that there are definitely gaps in fortification coverage and consumption patterns that the domestic research community could fill, in concert with global academics (KII7). The University of Cheikh Anta Diop's Human Food and Nutrition Research Laboratory is a center of excellence that has produced several high-level studies on micronutrient deficiencies and causes among different Senegalese population groups (Faye et al. 2020, 2025; Kebe et al. 2023).

Several Senegalese universities and institutes can also support the private sector with sampling and testing their products for certain micronutrients. They have the advantage of possessing multidisciplinary teams, including food technologists, nutritionists, biologists, and microbiologists as well as laboratories and key equipment, such as iCheck and HPLC, and titrimetric approaches (KII20). These techniques are all conducive for checking iodine and vitamin A. While there is minimal domestic capacity to support folic acid or zinc testing, some universities have partnerships with Research Institute for Development (IRD) in France that provides possible joint analyses of a more diverse set of micronutrients (KII20).

On the other hand, there seems to be less civil society capacity for government efforts with hands-on compliance measures via surveillance. Importantly, at least one consumer organizations mentioned engaging in "citizen control"; the organization took samples of wheat flour in Dakar's marketplaces, sent the samples to laboratories for testing, and then published the findings (KII13). However, such efforts are quite localized and unsystematic and depend on continued funding resources.

Summary and Policy Innovations

The findings from the PEDAL analysis are presented in Figure 3 below, with the scoring and evidence matrix summarizing the above components presented in Appendix 3. PEDAL highlights that Senegal generally has many strengths that thus far have helped its fortification program retain momentum. These include a general concurrence across the public, private, and civil society sectors that LSFF is a valuable intervention for addressing the country's micronutrient deficiencies. Due to a more than 20-year history with LSFF, it is widely accepted and bolstered by a well-respected multi-sectoral nutrition coordinating mechanism, CNDN, that often tries to align with

COSFAM. Many of the core functions of LSFF are overseen by one ministry, MIC, which deals with testing and surveillance through its national laboratory and its subnational commerce service administrations. Although the private sector complains that they are sometimes unfairly penalized by control agents (KII2,14, 15, 18), it is clear that sanctions are effective for compliance. By having DRI co-chair COSFAM, the Ministry is exposed to the full ecosystem of knowledge around LSFF, including the results of academic studies, the perspectives of civil society, and the grievances of business, while also serving as an interlocutor for these diverse stakeholders to other parts of government on issues such as premix taxes. Moreover, Senegal's civil society is robust and supportive of advancing LSFF through providing testing support to industry, engaging in "citizen control," and expanded sensitization through vendor training and public awareness campaigns.

Figure 3: PEDAL for Senegal

		Public Sector	Private Sector	Civil Society
Political Will	Interests	Maximize financial ownership	Maximize profit margins	Minimize food costs
		Minimize backlash from important constituencies	Minimize organoleptic changes	Maximize nutrition
		Maximize citizen well-being	Maximize reputational branding	Minimize health risks
	Ideas	State vs. market	State vs. market	State vs. market
	Leverage	Policymaker cohesion	Industry associations	Coalition alignment
		Sanctions	Strike potential	Public awareness campaigns
		Incentives	Lobbying power	Buying power
Implementation Capacity	Institutional architecture	Modalities for coordinating multisectoral policies	Modalities for industry agglomeration	Modalities for coordinating across CSOs
		Horizontal and vertical regulatory coordination	Modalities for coordinating across value chain segments	Geographical reach of CSOs
		Forums for issue articulation with private sector & civil society	Forums for issue articulation with public sector & civil society	Forums for issue articulation with public & private sector
	Technical requisites	Data for tracking consumption	Capacity for internal compliance testing	Capacity to assist with M&E
		Laboratories for monitoring compliance	Capacity for processing fortified foods	Capacity to train private sector
		Trained and incentivized bureaucrats to monitor compliance	Capacity on micronutrient storage	Capacity to train public administration

Notes: The color coding corresponds to the interval scale discussed in the Methodology section and elaborated on in the appendices. Grey coloring indicates that there was no data from interviewees or secondary sources to confirm. Lighter colors indicate that there are variations in the assessment depending on the food vehicle under consideration.

PEDAL also reveals several areas of either concern or major weakness. First, fortification efforts remain disproportionately donor and partner supported, especially in the last 5 years. With donor cuts and macroeconomic instability, this is likely to become more pronounced, worsening some of the major complaints that respondents highlighted (e.g. lack of reagents and high cost of premixes). Second, the lack of funding, combined with partners' interest in new vehicles, is raising concerns by policymakers; for instance, one noted that more attention for rice by partners who traditionally have been the major supporters of salt iodization could further undermine uneven progress on the latter program (KII1). In addition, the decline in funding is hampering the efficacy of COSFAM, which feels as though it has lost some visibility and direction; there are concerns that becoming more dependent on fewer partners results in COSFAM becoming co-opted by those partners' interests. As one respondent observed, "Right now, if a partner comes, the partner should accompany COSFAM with fortification, with the identified priorities for fortification. But it shouldn't be that a partner comes with the idea to fortify a food and that COSFAM should accompany this partner" (KII20).

Third, one area where COSFAM is devoting substantial time is with respect to discussions over bouillon fortification standards, which is proving highly contentious. Health professionals are generally opposed while others are agnostic or supportive. Although opponents request more scientific research (KII7, 17), it is less clear which types of research will be viewed as most legitimate. Indeed, while some findings suggest that bouillon accounts for as much as one-third of discretionary salt intake (Kebe et al. 2023), other studies suggest it is responsible for only 15 percent of sodium take (HKI and Groundwork 2024). In addition, while iodized household salt coverage is declining, iodine deficiency remains low likely because of inclusion of iodized salt in bouillon and other processed foods (Wegmüller et al. 2025). It is possible that this debate revolves more around the principle of trying to make an unhealthy food appear healthier rather than the empirical evidence about whether it will encourage more salt consumption or whether the gains in exposure to other micronutrients outweigh the costs of potentially more sodium exposure. Possible ways forward could include involving the bouillon industry to identify ways to reduce salt content in bouillon production and engaging in public awareness campaigns about the importance of using salt, bouillon, and other condiments moderately.

Relatedly, a fourth challenge relates to the lack of key data essential to further scale and refine Senegal's LSFF interventions. For instance, a more recent nationally representative micronutrient survey is badly needed to determine whether micronutrient standards need to be adjusted based on consumption patterns and how the addition of new vehicles like bouillon and rice might impact overexposure to nutrients (KII9). Furthermore, there is a lack of data on folic acid compliance despite the mandate for folic acid in wheat flour; not only do millers lack an accurate way of dosing this micronutrient but also no domestic laboratory is able to test for its presence.

Fifth, although the sanctions regime is pretty effective in enhancing compliance, private industry receives few incentives to help them bear the costs of fortification, including support for reagents, addressing rising premix costs or premix taxes. For wheat millers, the price ceilings on bread place another downstream cost on their production. Finally, some of the poorest Senegalese

are likely to keep purchasing the food they can best afford, which often tends not to be fortified. This includes tapa lapa bread, which does not have a fortification mandate, unrefined oil, and non-iodized salt. On the latter, about a quarter of consumers in the artisanal salt producing regions are estimated not to use iodized salt (KII12). Since the poorest are those most likely to be impacted by micronutrient deficiencies, ensuring they can afford fortified foods should be a priority.

Policy Innovations

Several policy innovations were proposed to address some of the above constraints, especially ideas to conserve on costs, enhance coordination of different industries, and to improve data transparency. Specifically, one idea is to establish a central purchasing unit in the West African subregion for different required premixes, testing kits, and reagents to address shortfalls in availability. This would ensure that supplies were locally available when needed and possibly mitigate against excessive price volatility or exchange rate fluctuations (KII4, 5). Another is to ensure that in the edible oil sector, those who do the artisanal crushing become more centralized to prevent the unrefined oil market from flourishing; this could be done either by grouping them together around refining factories that they are then obliged to use or requiring them to sell their unrefined products to the larger refiners (KII16). For this approach to work, "It's necessary that the government is interested and involved. If not, the crushers will not do it" (KII16).

The laboratory structure represents another area for possible intervention. Some respondents recommended a more decentralized lab system so that most samples did not need to go to Dakar for testing; instead, if equipment was available in different regions of the country, there could be more localized testing and less uncertainty about whether incidents of low compliance were due to micronutrient deterioration from transport (KII5, 6, 20). An alternative approach involves more specialization in each country in the ECOWAS region such that Senegal could become the leader for testing iodine compliance, for example, while other countries would specialize in other micronutrients (KII17). Although a proper assessment of how this could be feasibly implemented would be needed, it could have the potential to mitigate against replicating costly lab structures to test for all micronutrients in every country in the region while reducing the need to send samples outside of the West African region for some tests, such as for folic acid.

Finally, data on compliance and agents' capacity could be enhanced by extending a platform created for salt fortification to other food vehicles. As noted earlier, the DCI works with the regional and departmental commerce services to manage a platform that takes the geocoded location data of agents every time they go to a salt production site or to visit wholesale salt vendors. This enables the DCI to ensure that the agents are doing their work and provides a landscape of which places have been visited and the share of non-conformity with the iodization standard (KII5). Such a platform could be extended to wheat flour and oil for now, expanding to possibly other food vehicles later.

Conclusion

Senegal long has been a leader in Africa for its commitment to nutrition overall and to LSFF in particular. As the PEDAL framework reveals, the evidence of this commitment is apparent in several key respects. Private sector and civil society buy-in to LSFF is high, there are leading ministries and coordinating mechanisms, and a high capacity in the academic community to support data, research, and analysis. Yet, LSFF compliance remains uneven across vehicles and micronutrients. Wheat flour typically adheres to iron standards, but the lack of testing for folate and its rising cost for millers suggest there is lower compliance for this micronutrient, likely explaining Ndiaye et al.'s (2018) finding of high folate deficiency among women. Edible oil fortification is much more uneven due to regional smuggling and a powerful unrefined sector. Salt iodization has been the cornerstone of the LSFF program but the costs of potassium iodate and the poor quality of artisanal salt, among other challenges, continue to create inefficiencies.

The central weakness for LSFF in Senegal is high levels of donor dependence, increasingly so in recent years, starting with COVID-19, as other needs diverted government expenditures. This challenge has been exacerbated as the country now confronts a major shift in its macroeconomic situation. As the new government administration and its partners consider opportunities for fortifying additional vehicles that are widely consumed in the country, it is therefore imperative to avoid overextending scarce resources and capacities while consolidating existing gains and strategically planning to reduce financial vulnerability for LSFF activities in the future.

Appendix 1: Organizations interviewed

Organization	Date interviewed	Location interviewed	No. of respondents from organization
Association of Industrial Millers of Senegal (AMIS)	20-May-25	Virtual	1
Association of Salt Producers and CoopSel5V	23-Apr-25	Virtual	1
GB Foods	10-Sept-25	Virtual	1
Grands Moulins de Dakar (GMD)	9-Apr-25	Dakar, Senegal	2
Helen Keller International	14-May-25	Virtual	2
Institute of Food Technology (ITA)/ Senegalese Committee for Food Fortification (COSFAM)*	8-Apr-25	Dakar, Senegal	1
Ministry of Industry and Trade, Department of Industry, Directorate of Industrial Redeployment (DRI)/Senegalese Committee for Food Fortification (COSFAM)*	9-Apr-25	Dakar, Senegal	2
Ministry of Industry and Trade, Department of Trade, Directorate of Interior Commerce (DCI)	7-Apr-25	Dakar, Senegal	1
Ministry of Industry and Trade, Department of Trade, Division of Consumption and Consumer Safety	8-Apr-25	Dakar, Senegal	2
Ministry of Health, Directorate of Maternal and Child Health	7-Apr-25	Dakar, Senegal	1
Ministry of Health, Directorate of Non-communicable Diseases	23-May-25	Virtual	1
National Council of Nutrition Development (CNDN)	10-Apr-25	Dakar, Senegal	1
National Laboratory of Analysis and Control (LANAC)	8-Apr-25	Dakar, Senegal	1
National Union of Senegalese Consumers (UNCS)	9-Apr-25	Dakar, Senegal	2
Nouvelle Minoterie Africaine (NMA)	10-Apr-25	Dakar, Senegal	1
Patisen	12-Sept-25	Dakar, Senegal	1
Senegalese Standard Agency (ASN)	9-Apr-25	Dakar, Senegal	2
SENICO	7-Apr-25	Dakar, Senegal	1
SONACOS	9-Apr-25	Dakar, Senegal	1

University of Gaston Berger	25-Apr-25	Virtual	1

*COSFAM is not an independent entity but jointly managed by ITA and the Ministry of Industry and Trade.

Appendix 2: Operationalization of PEDAL

POLITICAL WILL

Public sector

Domains	Components	Scoring		
		3	2	1
Interests	Maximized financial ownership	Majority of financing for the technical, institutional, and control dimensions of LSFF come from the government	Government and donors equally contribute to provide financial support for the technical, institutional, or control dimensions of LSFF	Majority of financing for the technical, institutional, and control dimensions of LSFF comes from donors and partners
	Minimize backlash of important constituencies	There are no major sources of backlash that the government is concerned about	Government has expressed concern about potential pushback from business, civil society, or other groups	Government has expressed concern because of actual pushback from business, civil society or other groups
	Maximize citizen well-being	Government commits to fortification as key lever for nutritional well-being in policy documents	Government recognizes the need to address micronutrient deficiencies but may not have a fortification strategy	Government is actively concerned that LSFF might be threat to health outcomes by overconsuming too many micronutrients
Ideas	State vs. market	Government maintains open trade, marketing, and macroeconomic policy	Government maintains a hybrid policy regime	Government adheres to protectionist trade, marketing, and macroeconomic policies that impact access to raw materials and equipment for fortification
Leverage	Policymaker cohesion	All key ministries are aligned on key policy objectives and food vehicles	Ministries may disagree on policy objectives but are open to negotiation	Actual policy incoherence exists across ministries that undermines LSFF scaling

Domains	Components	Scoring		
		3	2	1
	Sanctions	Non-compliance is clearly defined and sanctions are consistently enforced	Sanctions for non-compliance are enforced erratically or not at all	There are no sanctions for non-compliance
	Incentives	Government actively provides policy support or other recognition to industries that fortify to standards	Government is open to providing policy support or other recognition to industries that fortify to standards but not actively doing so	Government is resistant to providing any type of policy support or recognition to industries that fortify to standards

Private sector

Domains	Components	Scoring		
		3	2	1
Interests	Maximize profit margins	Fortification adds minimal extra costs to profits due to supplemental support and policy	Fortification adds unsupported extra costs but these are accepted by industry	Fortification adds unsupported extra costs that create resistence to LSFF among industry
	Minimize changes to organoleptic properties	Fortification does not change a product's appearance, taste or texture	Fortification does change a product's appearance, taste or texture but has not impacted consumer acceptability	Fortification does change a product's appearance, taste or texture and it has impacted consumer acceptability
	Maximize reputational branding	Fortification offers opportunity to engage in social marketing around nutritious foods	Industry recognizes reputational benefits but is limited by low consumer awareness	Industry does not convey benefits of fortification for its reputation
Ideas	State vs. market	Balance of state vs. market intervention in food vehicle value chain is welcomed by industry	State intervention could be better targeted to support industry's incentives to fortify	State intervention is a major hindrance to private sector adherence for fortification mandates
Leverage	Industry associations	Industry members are well-represented by unions or associational bodies	There are many different unions that do not always convey the same interests	There are no unions or associational bodies for the industry
	Strike potential	Industry actors have ability to strike and are sizeable enough to get government's attention	Industrial actors have potential to strike but unlikely to impact government decisions	Industry actors do not have capacity or legal protections to strike
	Lobbying power	Industry actors are large enough to directly convey their preferences to government partners in regular cadence	Industry actors have erratic opportunities to convey their preferences to government partners	Industry actors are too weak (small) to convey their preferences to government

Civil society

Domains	Components	Scoring		
		3	2	1
Interests	Minimize food costs	Fortified foods are equivalent cost as non fortified foods	Some but not all fortified foods are viewed as too expensive for the poorest	Fortified foods are seen as too expensive for the poorest
	Maximize nutrition	Sizeable civil society supports fortification as key for micronutrient deficiencies	There are many civil society groups focused on nutrition, but few explicitly focus on fortification	Civil society groups vocally oppose LSFF as a "techno-fix"
	Minimize health risks	Fortified foods are recognized as safe	Concerns have been expressed about the health impacts of overconsuming certain fortified foods (e.g. salt, sugar, bouillon)	Consumers have expressed concern about health impacts of fortified foods
Ideas	State vs. market	Civil society accepts that state has responsibility to provide fortified foods	Civil society is agnostic about the role of the state in fortifying food vehicles	Civil society opposes state mandates to alter micronutrients in food supply
Leverage	Coalition alignment	Civil society is well-aligned with industry and public sector on fortification	Civil society is aligned on position on fortification but not aligned with industry or public sector	Civil society is divided over position on fortification
	Public awareness campaigns	There are ongoing and geographically diverse campaigns by civil society to enhance awareness of fortified foods (e.g. trainings with retailers, radio advertisements, billboards, etc).	There are sporadic and geographically targeted campaigns by civil society to enhance awareness of fortified foods.	There are no awareness campaigns happening in the country related to food fortification

Domains	Components	Scoring		
		3	2	1
	Buying power	Consumers are well accustomed to buying fortified foods	Consumers prefer to buy foods (counterfeit, smuggled, or lower quality) that are not fortified	Consumers actively boycott fortified foods

IMPLEMENTATION CAPACITY

Public Sector

Domain	Components	Scoring		
		3	2	1
Institutional architecture	Modalities for coordinating multi-sectoral policies affecting LSFF	Institutional mechanism exists to ensure coherent multi-sectoral policies impacting fortification	Institutional mechanisms exists on paper but there are areas of policy incoherence in practice	No institutional mechanism exists to ensure coherent multi-sectoral policies impacting fortification
	Horizontal and vertical regulatory coordination	Responsibilities of different agencies for fortification are clearly defined on paper and respected in practice	Responsibilities of different agencies for fortification are defined on paper but rarely respected	Responsibilities of different agencies for fortification are not clearly defined
	Fora for issue articulation with the private sector and civil society	Well-financed national fortification alliance	National fortification alliance exists but not sustainable in current form	No national fortification alliance
Technical requisites	Data for tracking consumption	Survey available from 5 years of less	Survey available but more than 5-10 years old	No survey conducted in the last decade
	Laboratories for monitoring compliance	Full capacitated laboratories for all micronutrients	National laboratories exist but they are not fully capacitated for testing all micronutrients	No national laboratories; everything is sent overseas
	Bureaucrats are sufficiently equipped to monitor compliance	Existing staff numbers and equipment are sufficient for monitoring compliance	Either staff numbers or equipment to ensure compliance	Insufficient staff, training, and equipment to monitor compliance

Private sector

Domain	Components	Scoring		
		3	2	1
Institutional architecture	Modalities for industry agglomeration	Sustainable modalities of business agglomeration that cooperate on fortification implementation	Agglomeration bodies exist but they operate erratically or with tension	No efforts to agglomerate small- or medium-scale industries
	Modalities for coordinating across segments of the value chain	Regularized meetings exist to ensure coordination across value chains that are mandatory for food fortification	Coordinating structures exist across value chains, but they meet infrequently	No modalities for coordinating
	Fora for issue articulation with the public sector and civil society	Industry leads or co-leads national fortification alliance	Industry are members of national fortification alliance	No national fortification alliance
Technical requisites	Capacity for internal compliance testing	Internal laboratories and well-stocked supply of test kits and reagents	Erratic supply of test kits and reagents	Lack materials for internal testing
	Capacity on processing fortified foods	Systematic use of microdoser and other equipment for adding vitamins and minerals to processed foods	Informal and non-systematic used of microdoser and other equipment for adding vitamins and minerals to processed foods	No knowledge about microdosing and other needed equipment
	Capacity on micronutrient storage	Processors engage in storage and distribution techniques that retain micronutrient quality	Variable knowledge within industry about degradation of micronutrients when exposed to certain temperatures and conditions	No knowledge about micronutrient storage

Civil society

Domain	Components	Scoring		
		3	2	1
Institutional architecture	Modalities for coordinating across CSOs	There is one main umbrella body to coordinate CSOs working on fortification	There are several different coordinating bodies for CSOs working on LSFF	There is no coordination body for LSFF-focused CSOs
	Geographical reach of civil society organizations/networks	There is a diverse range of nutrition CSOs in both rural and urban areas	There is a diverse range of nutrition CSOs across mulitple urban areas	CSOs are almost exclusively concentrated in the capital city
	Fora for issue articulation with the public and private sector	Civil society leads or co-leads national fortification alliance	CSOs are members of national fortification alliance	No national fortification alliance
Technical requisites	Capacity to assist with government M&E	Ability to support government with rigorous M&E of fortification programs	Ability to support with data and research, though not necessarily M&E of fortification programs	Weak or no research capacity
	Capacity to support private sector	CSOs are able to support industry with hands-on microdoser usage or lab testing for all micronutrients	CSOs are able to support some industry with hands-on microdoser usage or lab testing for just some micronutrients	Weak to no pragmatic experience with lab testing or microdosing
	Capacity to support compliance	CSOs have experience working on counterfeit goods, in informal retail spaces, and/or transnational borders	CSOs have conducted research about counterfeit goods, in informal retail spaces, and/or transnational borders	Weak to no experience with supporting compliance related to food

Appendix 3: Evidence Matrix for Senegal

POLITICAL WILL

Public sector

Domains	Components	Scoring	Justification
Interests	Maximize financial ownership	1	Almost all support for LSFF comes from donors and partners right now
	Minimize backlash of important constituencies	3	There are no real sources of active resistance against LSFF and a broad acceptance of the intervention by business and civil society
	Maximize citizen well-being	3	The government has had several multi-sectoral nutrition strategies in which it emphasizes the importance of fortification as a mechanism to tackle micronutrient deficiencies, and the third fortification strategy is soon to be launched.
Ideas	State vs. market	3	The government maintains a relatively liberal trade and macroeconomic regime for the relevant food vehicles
Leverage	Policymaker cohesion	2.5	Members of Ministry of Health and affiliated agencies oppose bouillon fortification but are willing to be persuaded with sufficient evidence.
	Sanctions	3	There is a very active sanctions regime, particularly for salt and wheat flour
	Incentives	2	There are ongoing multi-stakeholder efforts to shift policies that impact incentives for industry, notably related to taxes on premixes. There are no other incentive schemes in place.

Private sector

Domains	Components	Scoring	Justification
Interests	Maximize profit margins	2	There are a range of unsupported costs (premix taxes, VAT, dosing equipment, reagents, premix and raw material costs) but these have not seemed to cause active resistance by the private sector.
	Minimize changes to organoleptic properties	3	For existing food vehicles, this is not a deterrent concern, but millers need to be careful about the impact of iron on enzymes. There has also been some speculation about the importance of ensuring that rice fortification does not change the taste of rice.
	Maximize reputational branding	3	Fortification is widely accepted by industry
Ideas	State vs. market	2.5	Wheat industry is opposed to state intervention on wheat flour price ceilings, which increases the costs they need to absorb
Leverage	Industry associations	2.5	There are strong organizations among the millers via AMIS but less strong in other industries
	Strike potential	2.5	Wheat millers have several times threatened to halt flour production and delivery due to price ceilings that are viewed as damaging to their business, but it is not apparent that these threats have substantially impacted government pricing policy on wheat flour.

Domains	Components	Scoring	Justification
	Lobbying power	2.5	There have been regular meetings between the millers and government, a major forum with actors in the salt industry (though no mentioned engagement with the edible oil industry)

Civil society

Domains	Components	Scoring	Justification
Interests	Minimize food costs	2.5	This was only mentioned as a concern in communities where artisanal salt production occurs
	Maximize nutrition	3	Everyone interviewed from civil society and academia see the value in fortification for addressing micronutrient deficiencies
	Minimize health risks	2.5	Civil society remains divided over developing a mandatory standard for bouillon fortification
Ideas	State vs. market	*N/A*	*Not mentioned by respondents*
Leverage	Coalition alignment	3	No major areas of cleavage between civil society versus government and industry
	Public awareness campaigns	2	There have been many efforts by CSOs to enhance awareness, but these have been episodic and linked to donor financing.
	Buying power	2	Some consumers, particularly lower-income ones, are less aware of what fortification is and what the logos on products mean. This is especially acute for salt and edible oil.

IMPLEMENTATION CAPACITY

Public Sector

Domain	Components	Scoring	Justification
Institutional architecture	Modalities for coordinating multi-sectoral policies affecting LSFF	3	Senegal has a history of multisectoral nutrition policies that incorporate LSFF goals, and CNDN is a well-respected institution to help oversee coordination across ministries towards nutrition goals
	Horizontal and vertical regulatory coordination	3	Pretty well-defined responsibilities for LSFF under different departments in the Ministry of Industry and Trade. The country's decentralized structure helps with ensuring fortification oversight at the departmental and regional levels.
	Fora for issue articulation with the private sector and civil society	2	COSFAM is well-respected and convenes frequent meetings but is impacted by low funding, no permanent staff, and growing divisions based on donor priorities
Technical requisites	Data for tracking consumption	2	The most recent survey on consumption and micronutrient issues is from the 2018-2019 *Enquete Harmonisée sur les Conditions de Vie des Ménages*
	Laboratories for monitoring compliance	2	LANAC is the main accredited laboratory for testing vitamin A and iodine and can also test for iron. There are several other labs across the country that can conduct similar tests. But no lab is consistently testing for folic acid and they all suffer from a lack of reagents.
	Bureaucrats are sufficiently equipped to monitor compliance	2	There are close to 100 agents who work at multiple levels (national, regional, subnational) but they do not always have sufficient iCheck equipment and reagents and, in some cases, they may not be aware of the correct standards, especially for wheat flour. Agents on the border are a greater concern, especially for enforcing edible oil fortification compliance.

Private sector

Domain	Components	Scoring	Justification
Institutional architecture	Modalities for industry agglomeration	2	There are modalities for agglomeration of artisanal salt producers via cooperatives, but some of these are hampered by communal tensions while others have become stronger over time.
	Modalities for coordinating across segments of the value chain	1.5	For salt and edible oil, there appear to be few mechanisms to coordinate between more artisanal and industrial producers. This is not an issue for wheat flour where millers are mostly all industrial.
	Fora for issue articulation with the public sector and civil society	2	Industry are members of COSFAM and though they do not lead or co-lead it, their main interlocutor with the government--the Ministry of Industry and Trade--does
Technical requisites	Capacity for internal compliance testing	2	Large-scale industries all have internal laboratories and equipment to conduct qualitative and quantitative tests while artisanal salt producers have donated iCheck machines. But, there is no way for millers to test for folic acid and erratic availability of reagents remains a common concern for all food vehicles.
	Capacity on processing fortified foods	2	Industrial actors are typically quite formalized in their use of microdosers but some shortcuts are used for certain micronutrients and vehicles, most notably for folic acid, while artisanal producers often lack working dosing equipment.
	Capacity on micronutrient storage	2	Knowledge about micronutrient degradation remains a challenge for artisanal salt and edible oil processors

Civil society

Domain	Components	Scoring	Justification
Institutional architecture	Modalities for coordinating across CSOs	2	There are at least two major bodies that coordinate civil society, including the SUN movement and the Federation of Senegalese consumers
	Geographical reach of civil society organizations/networks	3	Some CSOs claim to work in all departments of the country
	Fora for issue articulation with the public and private sector	3	Academia is a co-leader of COSFAM and major consumer organizations and universities are members of the body
Technical requisites	Capacity to assist with government M&E	3	Senegal has a number of academic institutions and institutes with multidisciplinary training and access to key equipment to assist with M&E.
	Capacity to support private sector	2	Senegal has a number of academic institutions and institutes with multidisciplinary training and access to key equipment to assist with lab testing but no domestic capacity for folic acid or zinc
	Capacity to support compliance	1	Some CSOs have engaged in sporadic sampling and testing but nothing systematic

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