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Landscape analysis of opportunities and challenges related to the potential transition to MMS in Senegal

Final report

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ABOUT US

Nutrition International is a global nutrition organization headquartered in Ottawa, Canada. For more than 30 years, we have focused on delivering low-cost, high-impact, nutrition interventions to people in need. Working alongside governments as an expert ally, we combine deep technical expertise with a flexible approach, increasing impact without increasing complexity of cost. In more than 60 countries, primarily in Asia and Africa, Nutrition International nourishes people to nourish life.

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ABOUT THIS REPORT

The *Landscape analysis of opportunities and challenges related to the potential transition to MMS in Senegal* was completed by Nutrition International in partnership with the Government of Senegal and with generous financial support from the Eleanor Crook Foundation and The Waterloo Foundation.

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Acronyms and Abbreviations List

Abbreviation	Full form
ANC	Antenatal care
ANSD	*Agence nationale de la statistiques et de la démographie*/National Agency on Statistics and Demography
ARP	*Agence Sénégalaise de règlementation pharmaceutique*/Senegalese Pharmaceutical Regulatory Agency
BCI	Behaviour change intervention
BMI	Body-Mass Index
CBC	Complete Blood Count test
CFA	francs: Financial Community of Africa francs
CHNRI	Child Health and Nutrition Research Initiative
CHW	Community Health Worker
CNDN	*Conseil National de développement de la nutrition*/National Council on Nutrition Development
COSFAM	*Comité Sénégalais pour la fortification des aliments en micronutriments*/Senegalese Committee on Food Fortification in Micronutrients
DHS	Demographic and Health Survey
DMH	District Medical Head
DSME	*Direction de la santé de la mère et de l'enfant*/Mother and Child Health Directorate
ECF	Eleanor Crook Foundation
EML	Essential medicines list
ENDSS	*École nationale de développement sanitaire et social*/National School on Health and Social Development
GDP	Gross Domestic Product
GoS	Government of Senegal
Hb	Hemoglobin
HIV/AIDS	*Human Immunodeficiency Virus*/Aquired Immunodeficiency Syndrome
HKI	Helen Keller International
HPO	Health Promotion Officer
IB	Initiative de Bamako/Bamako Initiative
IFA	Iron folic acid
IR	Implementation research
ISMEA	Innovation for Maternal and Child Health in Africa
IMCI	Integrated Management of Childhood Illnesses
Insts	Academic Institutions
LA	Landscape analysis
MEO	Monitoring & Evaluation Officer
MMS	Multiples micronutrients supplements
MSAS	*Ministère de la santé et de l'action sociale*/Health and Social Action Ministry
MSNP	Multisectoral Strategic Nutrition Plan
MW	Midwife/midwives

PNDSS	*Plan national de développement sanitaire et social*/National Plan on Health and Social Development
NSP	National Supply Pharmacy
NSProg	Nutrition Strengthening Program
NutO	Nutrition Officer
PIPAEDS	Investing in the early years for human development in Senegal
PME	Petites et moyennes entreprises/Small and Medium Enterprises
PNC	Post natal care/consultation
PO	Pharmacy Officer
PSI-SRMINIA_N	Plan stratégique intégré de la santé de la reproduction, de la mère, du nouveau-né, de l'enfant, de l'adolescent et la nutrition/ Strategic Integrated Plan on reproductive, mother, newborn and adolescent health and of nutrition
PSNSE	*lan stratégique national pour la survie de l'enfant*/National Strategic Plan on Child Survival
PW	Pregnant Women
REO	Regional Executive Office
RHO	Reproductive Health Officer
RHCS	Reproductive Health and Child Survival
RMH	Regional Medical Head
RMNHN	Reproductive, Maternal, Neonatal Health and Nutrition
RQ	Research question
RSP	Regional Supply Pharmacy
SEMA	Shaping Equitable Market Access for reproductive health project
SP	Sulfadoxine & Pyrimethamine
SUN	Scaling Up Nutrition movement
TFP	Technical & Financial Partners
TWF	The Waterloo Foundation
UCAD	Université Cheikh Anta Diop
UN	United Nations
UNICEF	United Nations Children`s Fund
USAID	United Stated Agency for International Development
WA	Warehouse attendants
WFP	World Food Program
WHO	World Health Organization
WRA	Women of Reproductive Age

Executive Summary

BACKGROUND

Antenatal multiple micronutrient supplementation (MMS) is more effective and cost-effective than iron and folic acid (IFA) supplementation in improving birth outcomes, has equivalent benefits in preventing maternal anaemia, and is safe for mothers and babies (Smith, et al 2017 & Keats, et al 2019). In 2020, the World Health Organization (WHO) recommended that implementation research (IR) be conducted in settings where the transition from IFA to MMS is being considered in low- and middle-income countries (LMICs).

Based on the recent WHO recommendation and the maternal and newborn needs in the country, the Government of Senegal (GoS) is considering the introduction of MMS for pregnant women through antenatal care (ANC). An MMS Taskforce was developed in March of 2024 by the Mother and Child Health Directorate (DSME) and a Roadmap for MMS scale up developed. Nutrition International worked in partnership with the GoS, with funding and support from The Eleaner Crook Foundation (ECF) and the Waterloo Foundation (TWF) to complete a landscape analysis (LA) to better understand opportunities and challenges related to the potential introduction and scaling of MMS, including identification of the most important issues to be explored through implementation research or addressed via recommendations should the GoS decide to proceed.

METHODS

To kick-off the LA process, a Stakeholder Engagement workshop, chaired by the DSME, was conducted in April 2024 in Dakar, Senegal to share background, evidence, global guidance and the proposed LA process. A literature review on maternal nutrition policies, standards, programs, and partnerships was conducted before field data collection in Senegal, focusing on IFA supplementation. Four regions (Dakar, Kaffrine, Kolda, Ziguinchor) were selected based on process-level criteria like IFA distribution and midwife-to-pregnant women ratios, with considerations of local factors. Questionnaires were developed to gather comprehensive data on four key pillars, including: policies, service delivery, product supply, and financing, focusing on the existing ANC platform and IFA supplementation program, with the idea that introduction of MMS would inherit similar bottlenecks. Seven interviewers were trained, and data was collected in May and June 2024, involving key stakeholders at the national, regional, district, and facility levels. Interviews were transcribed and analyzed using a matrix linked to the four pillars, with results highlighting findings, stakeholder perceptions, and identifying bottlenecks and opportunities for potential MMS introduction and scale. Results were shared and validated at a second workshop, also chaired by the DSME, in July of 2024 in Dakar, Senegal. Participants were asked to develop potential solutions to identified challenges and research questions were developed based on the proposed solutions. Democratic prioritization of research domains and respective questions to be tested through MMS IR, and collaborative development of recommendations should the GoS proceed with a transition to MMS, were also completed at the second workshop.

KEY FINDINGS

The following findings are synthesized from the desk review, primary data collection, and validation exercise and are organized per pillar and into key opportunities and challenges for the potential introduction and scale of MMS in Senegal through its public ANC platform.

1. **Policies and protocols:** Several policies, standards and protocols are available to guide and support a potential MMS program in Senegal, however some updating and alignment according to a clear process is required. Recommendations and protocols around

anaemia detection and treatment are not aligned across policies and need to be harmonized, which will be of particular importance in the context of MMS introduction and scale.

2. **Service delivery:** Training of healthcare providers lacks a maternal nutrition focus, and further capacity building is needed around behaviour change techniques. Maternal nutrition service delivery lacks resources, particularly regarding staffing and the distribution of staff, as well as supportive supervision. Lack of coordination, the overburden of healthcare workers, and the inaccessibility of ANC were also identified as key challenges. A strong midwives' association, dedication to the provision of quality ANC, the existence of focal points dedicated to nutrition at regional and district levels, and the potential to utilize community health workers were identified as opportunities.
3. **Product and supply:** Product shortages at the national supply pharmacy with repercussions at regional and district levels, stock management software, IFA formulation, poor storage conditions, and a varied end-user price for IFA were identified as key challenges. The potential for local procurement, high level of training for pharmacists, and potential of stock management mechanisms and software were identified as opportunities. Respondents indicated a preference for blister strip packaging.

4. **Financing:** There is a dedicated line for nutrition in the Prime Minister's Office budget; however, the budget allocated to maternal nutrition is insufficient.

The primary data collection highlighted and confirmed local authorities' interest in transitioning from IFA to MMS, as reflected in the Multisectoral Strategic Nutrition Plan (MSNP) 2024-2028, which calls for studies on MMS feasibility (p 136). Key findings were then developed into research questions and recommendations and prioritized as follows:

Prioritized Implementation Research Domains and Respective Questions for the Potential Introduction of and Transition to MMS in Senegal

Rank	Domain	Respective RQs
1	Access and availability of ANC	How can we improve provider capabilities to optimize access to MMS through ANC?
2	Access to and consumption of MMS	Which are the most effective behaviour change initiatives to promote delivery of and adherence to MMS for pregnant women?
		Which financing mechanism can best facilitate access to MMS for pregnant women?
		How can the community be mobilized to improve pregnant women's adherence to MMS?
3	Distribution of health personnel	How can the distribution of providers within a district affect pregnant women's adherence to MMS?
		How can the different categories of healthcare providers (nurses and midwives) and community actors interact to optimize access to ANC and MMS adherence?
4	Forecasting and storage	How can we improve stock managers' skills and knowledge, including of storage standards to ensure the continued availability of MMS?
		What strategies are needed to ensure that adequate storage conditions are established and maintained for MMS?
5	Capacity of frontline health workers, stock managers, and	What mechanisms need to be put in place to improve the capacity (knowledge and skills, including counseling) of service providers, including community actors, to deliver quality maternal nutrition services,

	quality of antenatal care	including MMS supplementation, as part of comprehensive ANC, to increase the uptake of MMS?
		How can we improve stock managers' skills and knowledge, including of storage standards to ensure the continued availability of MMS?
6	Stock distribution and packaging	Which delivery method(s) would best ensure access to MMS for pregnant women?
		What type of packaging best supports pregnant women's adherence to MMS?
7	Health services information and coordination	How can strengthening the health information system help improve adherence to MMS among pregnant women?
8	Importation	How can a continuous and adequate supply of MMS be effectively ensured?

RECOMMENDATIONS

- **MMS IR should be conducted in Senegal** to test potential solutions to identified barriers using the ranked domains and questions above. The MMS Taskforce should coordinate and oversee all MMS IR in Senegal including resource mobilization to support these activities. Results from MMS IR can provide critical information to guide the SMART transition and scale of MMS in Senegal.
- **Policies and protocols:** A clear process should be developed and executed for alignment and updating of content across policies and protocols relating to maternal nutrition and to support the transition to and scale up of MMS. Alignment of content across policies and protocols to achieve harmonization will help to ensure optimal anaemia detection and treatment; and the abbreviation "MMS" should be clarified in the MSNP.
- **Service delivery:** To take forward the successful transition to and scale up of MMS, ANC providers require additional training and tools to reinforce maternal nutrition and behaviour change techniques, along with appropriate follow-up to ensure skill integration. Distribution of healthcare staff and roles and responsibilities of community health personnel should be revisited.
- **Supply chain:** Stock outs at the central level and the cascading repercussions were identified as one of the biggest barriers to IFA programming in Senegal and must be resolved. In addition, MMS should be added to the Essential Medicines List.
- **Financing:** A specific budget line is required to ensure a sustainable supply of MMS at the central level, and domestic resource mobilization for MMS should be explored. MMS should be subsidized for pregnant women.

NEXT STEPS

The GoS now has a collaborative list of recommendations and ranked research questions per prioritized domain to complement the MMS Taskforce's Roadmap. The Roadmap and prioritized list of questions and recommendations can be used to support GoS' decision-making and coordination of partners' efforts to introduce and scale MMS in a sustainable, measurable, achievable, resourced, and tailored (SMART)[1] way. Next steps include working with the MMS Taskforce to further validate the prioritized list and recommendations; secure funding and assign research domains and questions to respective partners; and, advocate for increased support to actualize recommendations.

[1] Nutrition International, 2023

Introduction

Antenatal multiple micronutrient supplementation (MMS) is more effective and cost-effective than iron and folic acid (IFA) supplementation in improving birth outcomes, has equivalent benefits in preventing maternal anaemia, and is safe for mothers and babies (Smith, et al 2017 & Keats, et al 2019). In 2020, the World Health Organization (WHO) recommended that implementation research (IR) be conducted in settings where the transition from IFA to MMS is being considered in low- and middle-income countries (LMICs). IR is useful to understand how to effectively implement proven interventions, such as antenatal MMS, in real-life settings and can be used to identify and investigate issues and challenges that prevent effective implementation of interventions like antenatal MMS and to develop and test solutions to these issues. Since the 2020 WHO recommendation, the global MMS landscape has been changing quickly, with many LMICs exploring the transition from long-standing IFA programs to MMS.

Based on the recent WHO recommendation and the maternal and newborn needs in the country, the Government of Senegal is considering the introduction of MMS for pregnant women through ANC. Nutrition International (NI) worked in partnership with the Government of Senegal (GoS), with funding and support from The Eleaner Crook Foundation (ECF) and the Waterloo Foundation (TWF) to complete a landscape analysis (LA) to better understand opportunities and challenges related to the potential introduction and scaling of MMS, including identification of the most important issues to be explored through implementation research or addressed via recommendations should the GoS decide to proceed. This report details the findings of the LA and summarizes recommendations for next steps.

NATIONAL AND REGIONAL STATUS OF MATERNAL AND NEONATAL HEALTH AND NUTRITION IN SENEGAL

Maternal and neonatal health (maternal, neonatal and perinatal mortality, prematurity, stillbirths)

Data available from demographic and health surveys (DHS) show a downward trend in child mortality between 2005 and 2019 (Figure 1), regardless of cause, but no significant change was observed between 2019 and 2023 (ANSD & ICF, 2023).

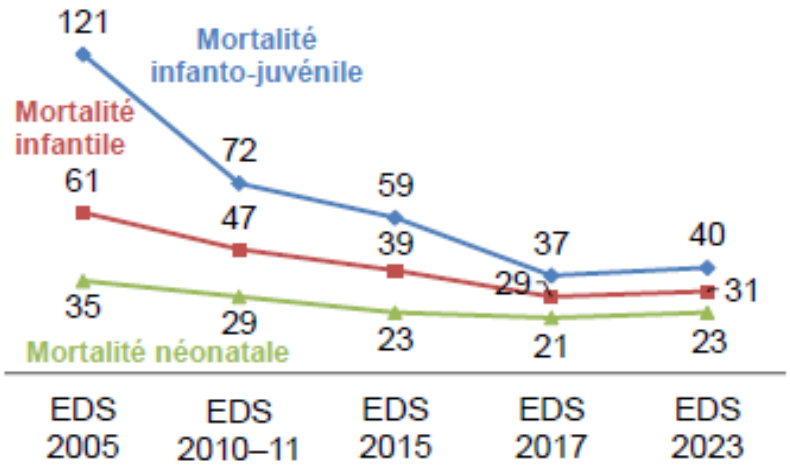


Figure 1. Child mortality (under 5) (ANSD & ICF, 2023).

Among women, the pregnancy-related mortality ratio (ANSD & ICF, 2018) was estimated at 401 deaths per 100,000 live births in the 6-year period prior to the 2005 DHS (Ndiaye & Ayad, 2006). The ratio fell to 273 deaths per 100,000 live births in the 6-year period prior to the 2017 DHS (Figure 2). This decline is statistically significant.

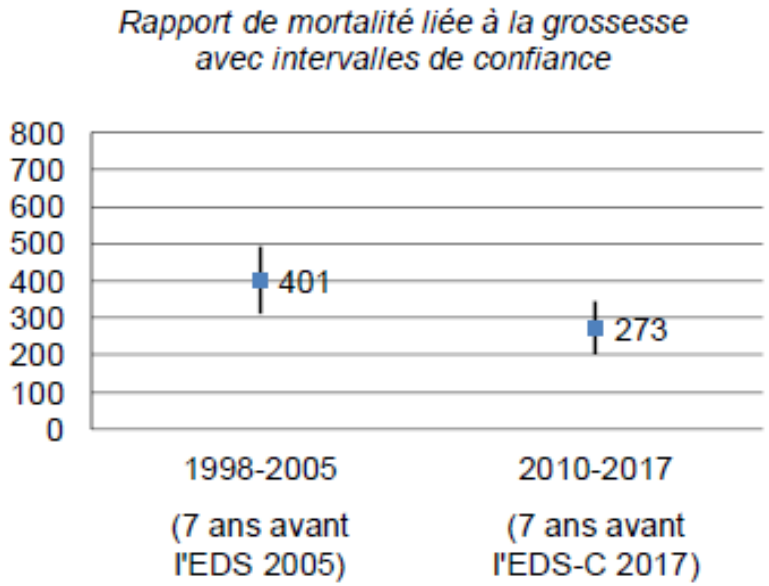


Figure 1. Pregnancy-related mortality with confidence intervals, 2005-2017 (ANSD&ICF, 2018)

Perinatal mortality decreased slightly between 2005 and 2017. DHS 2005 data (Ndiaye & Ayad, 2006) and 2017 surveys (ANSD & ICF, 2018) show a decline in perinatal mortality rate from 45 to 41 deaths per thousand pregnancies of seven months or more (41%). In 2017, however, there were noticeable regional variations (Table 1): Kédougou had the lowest rates (25%), followed by Tambacounda (31%). The regions of Sédhiou (54%), Kaolack (51%) and Louga (49%) had the highest risks of perinatal mortality.

Table 1. Perinatal mortality rates in the five years preceding the survey, per region (ANSD&ICF, 2018).

Region	Perinatal mortality rate (per 1000 pregnancies of seven months or more)
Dakar	39
Ziguinchor	39
Diourbel	35
St-Louis	43
Tambacounda	31
Kaolack	51
Thiès	37
Louga	49
Fatick	40
Kolda	44
Matam	40
Kaffrine	43
Kédougou	25
Sédhiou	54
National	41

Nutritional status of women of reproductive age (15-49) and newborns

Between 2005 and 2010–2011, underweight[2] rose slightly among WRA, going from 18.2% (Ndiaye & Ayad, 2006) to 22% (ANSD & ICF, 2012), while overweight and obesity[3] remained stable (21.9 to 22.3%). Anaemia decreased slightly among WRA in general (from 59.1% to 54.1% between 2005 and 2017) but a greater reduction was observed among pregnant women (70.6% in 2005 and 62.7% in 2017). In 2018, the *Comité Sénégalais pour la fortification des aliments en micronutriments* (COSFAM) carried out a study among 103 pregnant women, which showed that 31% were anaemic, while 8.2% and 37% were deficient in vitamin A and folic acid respectively. Another research conducted among WRA (n = 1,012) by Ndiaye et al. (2018) showed a high prevalence of folic acid deficiency (54.8%).

Data from the 2005 (Ndiaye & Ayad, 2006) and 2019 DHS (ANSD&ICF, 2019) show an increase in the prevalence of low birth weight (< 2.5 kg), which rose from 6.3% to 11.6% during this period. Furthermore, between 2005 (Ndiaye & Ayad, 2006) and 2023 (ANSD & ICF, 2023), the prevalence of malnutrition in children under five remained fairly stable, with stunting ranging from 20% to 18% and wasting from 9% to 10%.

As for malnutrition among WRA, there are regional disparities for babies born with a low birth weight (Table 2).

Table 2. Prevalence (%) of babies born with low birth weight, and underweight/overweight and anaemia in women of reproductive age (WRA).

	Prevalence of low birth weight [1]	Prevalence of underweight/overweight among WRA[2]		Prevalence of anaemia among WRA[3]
Region	< 2.5 kg	BMI < 18.5	BMI ≥ 25	Hb < 11 g/dl PW

[2] "Underweight" is considered having a Body Mass Index (BMI) < 18.5.

[3] "Overweight and obesity" is considered having a BMI ≥ 25.

				Hb < 12 g/dl (WRA)
Dakar	10.9	16.5	33.2	52.7
Ziguinchor	10.7	11.4	26.0	47.0
Diourbel	10.8	29.4	13.8	55.5
St-Louis	11.0	20.6	20.9	54.5
Tambacounda	12.8	25.4	19.1	56.3
Kaolack	13.0	18.6	15.5	53.4
Thiès	10.7	20.9	20.6	52.3
Louga	13.3	39.3	13.0	61.5
Fatick	11.3	16.1	18.5	52.8
Kolda	12.6	25.9	17.2	57.6
Matam	13.1	27.0	15.2	55.5
Kaffrine	13.9	24.2	12.6	57.5
Kédougou	12.3	19.1	9.9	45.0
Sédhiou	11.5	21.3	13.0	52.6
National	11.6	22.0	21.3	54.1

[1] ANSD & ICF, 2019
[2] ANSD & ICF, 2012
[3] ANSD & ICF, 2018

Antenatal and postnatal essential nutrition interventions coverage

Table 3 presents data on the WHO recommended essential nutrition interventions indicators (2019). For some indicators, no information is available.

Table 3. Antenatal and postnatal essential nutrition and health intervention coverage, Senegal.

Essential nutrition interventions (WHO, 2019)		
Interventions	**Coverage**	**References and Notes**
Multi-sectoral		
A healthy diet[4]	Unavailable	This intervention is included in the Multisectoral Strategic Nutrition Plan (MSNP) 2024-2028 (promotion of a healthy diet, low in sugar, fat and sodium).
Iodized salt	71%	Percentage of households with iodized salt (ANSD&ICF, 2018). This intervention is included in the MSNP 2024-2028 (CNDN, 2024).
Flour/oil enrichment	85% /73%	Genève International (2014) : % of WRA who consume fortified flour or oil at least once a week. This intervention is included in the MSNP 2024-2028 (CNDN, 2024).
Newborn babies		
Delayed clamping of the umbilical cord	Unavailable	This intervention is included in the documents on Policies, Norms & Protocols on Reproductive Health and Child Survival Services: Maternal Perinatal and Neonatal Health (MSAS, 2018a).

[4] A healthy diet has been defined as follows: a) intake of free sugars to less than 10% of total energy intake, b) potassium intake of at least 90 mmol/day (3510 mg/day) for adults, c) sodium intake to below 2 g/day sodium (5 g/day salt) in adults, d) total fat intake less than 30% of total energy intake, e) -saturated fatty acid intake less than 10% of total energy intake, f) - *trans*-fatty acid intake less than 1% of total energy intake and, g) the consumption of least 400 g, or five portions, of fruit and vegetables per day (WHO, 2019)

Early initiation of breastfeeding	36.1%	(ANDS&ICF, 2023). This intervention is included in the National Strategic Plan on Child Survival (PSMSE) 2007-2015 (MSAS, 2007) and the MSNP 2024-2028 (CNDN, 2024).
Kangaroo Mother Care for low-birthweight babies	79%	Integrated Strategic Plan on Reproductive, Mother, Newborn, Child and Adolescent Health and, of Nutrition (PSI-SRMINIA_N) 2024-2028(MSAS, 2024). Recommended intervention for newborns weighing between 1000 – 2500 g. This intervention is included in the PSMSE 2007-2015 (MSAS, 2007) and the MSNP 2024-2028 (CNDN, 2024).
Adolescent girls		
Daily IFA supplementation	Unavailable	Recommended if prevalence of anaemia ≥ 40% for 90+ days (WHO, 2016a). Weekly IFA supplementation to adolescent girls is included in the MSNP 2024-2028 (CNDN, 2024).
Pregnant women (PW)		
Daily IFA supplementation (taken)	67.1%	% of PW who have taken at least 90 tablets of IFA (ANSD&ICF, 2020). The IFA supplementation of PW is included in the MSNP 2024-2028 and the Policies, Norms & Protocols on Reproductive Health and Child Survival Services: Food and Nutrition (MSAS, 2018b).
Energy-protein supplementation	Unavailable	Recommended if the prevalence of low weight ≥ 20% (WHO, 2019). This intervention is included in the MSNP 2024-2028 (CNDN, 2024).
Vitamin A supplementation	Unavailable	Recommended if the prevalence of vitamin A deficiency ≥ 20% (WHO, 2019) In the MSNP 2024-2028 (CNDN, 2024), the inclusion of vitamin A in the universal medical coverage is planned without specifying if it should be for young children or women while in the PSMSE 2007-2015 (although this is a old document which does not seem to have been updated), there is a recommendation of providing vitamin A supplementation to post-partum women.
Calcium supplementation	Unavailable	Recommended if dietary calcium intake is low (WHO, 2016b). This intervention is included in the MSNP 2024-2028 (CNDN, 2024) but it targets pregnant women for whom calcium intake is insufficient.
WRA (15-49)		
Daily iron supplementation with/without folic acid for post-partum women	Unavailable	Recommended if prevalence of anaemia in women during pregnancy is ≥ 20% (WHO, 2019) This intervention is included in the PSMSE 2007-2015 (MSAS, 2007): “IFA supplementation during the first six months after delivery”).
Daily iron and folic acid supplementation of WRA	Unavailable	Recommended if the prevalence of anaemia in WRA ≥ 40% (WHO, 2016a). Intermittent IFA supplementation is not formally planned but in the MSNP 2024-2028 (CNDN, 2024), there is a mention about the possibility of implementing this intervention.

Health interventions targeting pregnant women (WHO, 2019)		
Malaria prevention with Sulfadoxine & Pyrimethamine (SP) (during the 2e and 3e trimesters)	92.5%	Percentage who received 1 or more doses of SP/Fansidar during an antenatal visit. Targeted if the PW lives in an area where malaria is endemic (ANSD & ICF, 2020). This intervention is included in the Policies, Norms & Protocols on Reproductive Health and Child Survival Services: Maternal, Perinatal and Neonatal Health (MSAS, 2018a).
Use of an insecticide-treated mosquito net previous night	68.1%	Targeted if the PW lives in an area where malaria is endemic (ANSD & ICF, 2020). In Policies, Norms & Protocols on Reproductive Health and Child Survival Services: Maternal, Perinatal and Neonatal Health (MSAS, 2018a), the prescription of long-lasting insecticidal bednet to PW is included.
Deworming after the 1st trimester	49.9%	Percentage of PW dewormed at last birth. Targeted if the PW lives in an area where both: (i) the baseline prevalence of hookworm and/or T. trichiura infection is ≥ 20% among pregnant women, and (ii) anaemia is a serious public health problem (WHO, 2017). This intervention is included in the Policies, Norms & Protocols on Reproductive Health and Child Survival Services: Food and Nutrition (MSAS, 2018b).
Skin-to-skin contact	Unavailable	Immediately after birth. This intervention is included in the Policies, Norms & Protocols on Reproductive Health and Child Survival Services: Maternal, Perinatal and Neonatal Health (MSAS, 2018a).
Skilled birth attendance	98.5%	Qualified personnel include doctors, midwives, nurses/head nurses, nurses' aides (ANSD & ICF, 2023).
Pregnant women protected against neonatal tetanus	59.1%	(ANSD & ICF, 2023).

Antenatal and postnatal consultations – Coverage

Table 4 presents data from the most recent survey of antenatal and postnatal consultation coverage (ANSD & ICF 2023). Approximately 60% of pregnant women had had at least four ANC visits in 2023, compared with just 40% in 2005 (Ndiaye & Ayad, 2006), an increase during this period. However, there were also regional disparities in 2023. Data from the 2019 DHS (ANDS & ICF, 2019) show that approximately half of pregnant women had taken a deworming drug during their pregnancy, while two thirds had taken at least 90 IFA tablets.

Table 4. Coverage (%) of ANC contacts, IFA supplementation, and deworming for PW by region, Senegal.

Region	% of PW having completed 4 ANC contacts[1]	% of PW having taken 90 IFA tablets[2]	% of PW having taken a deworming medication[3]
Dakar	71.3	71.9	56.2
Ziguinchor	74.3	70.4	71.4
Diourbel	67.7	71.9	50.1
St-Louis	62.7	67.4	44.3
Tambacounda	64.7	50.2	31.6
Kaolack	77.1	64.2	42.8
Thiès	72.1	75.6	59.6
Louga	70..8	62.3	36.1
Fatick	73.4	70.6	53.4
Kolda	67.8	57.0	59.8
Matam	49.6	69.1	30.9
Kaffrine	68.6	53.2	39.8
Kédougou	58.2	51.6	34.3
Sédhiou	51.7	62.6	67.5
National	60.6	67.1	49.9

[1]ANSD & ICF, 2023: % of women aged 15-49 with live birth or stillbirth in the 2 years preceding the survey.
[2]ANSD & ICF, 2019: Number of days they took iron ('have taken'), in tablet or syrup form, during their last pregnancy.
[3]ANSD & ICF, 2019: Among women who had a live birth in the 5 years prior to the survey, percentage who, during the most recent pregnancy, had taken deworming medication.

As for postnatal consultations, 82.8% of women attended one consultation within two days of giving birth in 2017 (ANSD & ICF, 2018), which represents a significant improvement from 2005, when only 27.5% had done so (Ndiaye & Ayad, 2006). This may be because more women give birth in health facilities with qualified staff, where numbers have grown to approximately 68% in 2017 (ANSD & ICF, 2018) compared to 52% in 2012 (ANSD & ICF, 2012).

While considering both prevalence of women completing four ANC contacts and prevalence of women having taken 90 IFA tablets, it appears that the region of Tambacounda has the lowest prevalence for the last indicator but not the lowest rate of women having taken 90 IFA tablets. The explanation can be in relation with a greater shortfall of IFA in this region and potentially, the lowest compliance to IFC due the side effects.

Landscape Analysis

METHODOLOGY

Literature review

Prior to the field collection, a literature review was conducted via web searched and document sharing with Nutrition International's Senegal office. The literature review covered policies, standards, programs, partnerships and any other study evaluating maternal nutrition programs — particularly IFA supplementation. Key documentation is described in the sections that follow.

Site selection

Four regions (Dakar, Kaffrine, Kolda, Ziguinchor) were selected for field data collection for the LA. The following process-level indicators were considered as the criteria for the choice of the sites: a) proportion of pregnant women receiving at least 90 tablets of IFA during their last pregnancy (Table 4), b) proportion of PW who had been dewormed during their last pregnancy (Table 4) and, c) ratio of midwives to PW (Table 6). Regions with the highest and lowest coverage rates were identified for each criterion. This analysis was combined with local knowledge of health infrastructure, geographical considerations and sociopolitical/demographic information to finalize the selection of regions.

Questionnaire development

The questionnaires that Nutrition International used for Nigeria's MMS landscape analysis were revised to consider the WHO recommended questionnaires for malnutrition LA (WHO, 2012). This process ensured conformity with international literature and allowed for complete data collection for each pillar to investigate a) policies and protocols, b) service delivery, coordination and partnerships, c) product and supply, and d) financing. Several questions were added to the initial Nutrition International questionnaire, mainly concerning monitoring and evaluation, staff capacity and perceptions regarding pregnant women malnutrition issues, and coordination. In total, we developed 11 questionnaires. The matrix used in the original WHO LA was also adapted for the data analysis.

Interviewers

Seven interviewers were hired using the following criteria: previous experience in conducting health and nutrition surveys, ability to communicate in Wolof and/or Peul, and completion of a minimum of a bachelor's degree in health or a related subject. Prior to field data collection, a two-day training course was held in Dakar, followed by practical exercises on May 20, 2024. Two consultants and two Nutrition International staff members joined the team, allowing for five data collection teams.

Data collection

Field data collection took place from May 21–24, May 27–30 and June 8–12, 2024. Every interviewer took part in data collection at various levels (health region, district, centres, posts and health huts), as did the two consultants (national and international) and the two Nutrition International staff members (national director and the head of monitoring and evaluation). The seventh interviewer conducted interviews with targeted entities, including nutrition focal regional point representatives who attended a meeting in Thiès during the data collection. In one case, the questionnaire was emailed to the interviewee to be completed. Each interview was either recorded (after requesting permission from the interviewee) or the data was entered directly into the questionnaire by one of the two team members during the interview.

Data analysis

Research professionals transcribed every recorded interview, which the consultants read. A matrix was designed prior to data collection and was used to link every question of the various questionnaires to the appropriate pillar, i.e.: 1. Policies and Protocols, 2. Service delivery; 3. Product and Supply; and 4. Financing.

Results

The following sections provide the information compiled during the literature review, which was presented at the first workshop (April 29-30, 2024) in Dakar (please see workshop 1 report). For each pillar, the field data component of the LA complements the information from the literature review. In addition, presented are some details of stakeholders' perceptions of the nutrition landscape in Senegal collected during the landscape analysis. The results section concludes with a list of bottlenecks and opportunities which have been identified for each pillar.

Table 5 shows the interviews planned and conducted during the LA. Fifty-two (52) interviews were conducted regionally and 9, centrally. On average, interviews lasted between 45 minutes (for questionnaires 7 and 8) and 120 minutes (for the other questionnaires).

Table 5. Description of interviews planned *vs* carried out during the landscape analysis.

Location	Level	Interviews planned	Interviews conducted
Regions: Kaffrine, Kolda, Ziguinchor, Dakar	Regional	24: 4 regional medical heads (RMH) 4 nutrition officers (NutO) 4 reproductive health officers (RHO) 4 monitoring & evaluation officers (MEO) 4 health promotion officers (HPO) 4 pharmacy officers (PO)	16: 3 RMH 4 NuO 3 RHO 2 HPO 1 MEO 3 PO
	District	32: 8 district medical heads (DMH) 8 Midwives (MW) 8 PO 8 Warehousing attendant (WA)	15 : 4 DMH 3 MW 3 PO 5 WA
	Health post	24: 8 head nurses (HN) 8 MW 8 WA	16: 3 HN 4 MW 6 WA 1 traditional birth attendant 2 « Bajenu Gox »[1]
	Health hut	8: 4 Community health workers (CHW) 4 « Bajenu Gox»	5: 3 CHW 2 « Bajenu Gox »
National level: Technical and financial partners (TFPs), Associations (Asc.), Academic Institutions (Insts), Conseil National de Développement de la Nutrition (CNDN), Government (Gvt)	National	22: 13 TFP 2 Asc. 2 Inst. 1 CNDN 6 Gvt	9: 5 TFP 1 Asc. 0 Inst. 1 CNDN 2 Gvt

[1] The "Bajenu Gox" is a community woman who volunteers to provide support to women during pregnancy.

Information collected among health workers, especially among midwives, began to be redundant after visiting Kaffrine and Kolda regions. Moreover, no new information was obtained in Dakar region which was the last area where landscape interviews were conducted. This led the team to believe data saturation had been reached.

Perception of nutrition problems

Malnutrition, and in particular anaemia, among PW and young children, is recognized as a major nutrition problem by both national-level players and health providers in the regions, districts, health centres, health posts and health huts. For newborns, the main nutrition problems raised were preterm infants, low birth weight and stillbirths. The most frequently cited causes of nutrition problems are poverty, lack of knowledge about good nutrition (variety and quantity), the limited use of available and local food products and certain food taboos (particularly around eggs and meat).

PILLAR 1 - POLICIES AND PROTOCOLS

Senegal has several policies, standards and protocols related to maternal nutrition. The key ones, including micronutrient supplementation, are presented in the following section.

a. **National pharmaceutical policy (Ministère de la santé et de la prévention médicale, 2006)** which aims at ensuring a regular supply of quality medicines, strong pharmaceutical regulation, local pharmaceutical production, adequate pharmaceutical funding and active operational research.

b. **Senegal's list of essential medicines** – see the product and supply section below.

c. **National Nutrition Development Policy 2015-2025 (Ministère de la santé et de l'action sociale/MSAS, 2015)** – with the general objective of ensuring optimal nutritional status for all, particularly children under five, women of childbearing age and adolescents, notably through improved access to and use of quality health services (intermediate objective).

d. **Senegal's Multisectoral Strategic Nutrition Plan /MSNP 2024-2028 (CNDN, 2024).** The MSNP includes 18 sectoral government plans& budgets and describes six specific objectives to be achieved by 2028, including: #5: Reduce the prevalence of anaemia among vulnerable groups (including pregnant women) to less than 40%; and, #6: Reduce the prevalence of other micronutrients deficiencies (iodine, zinc and vitamin A) to less than 20%. Six work streams have been identified. Stream three focuses on combating micronutrient deficiencies. In the MSNP, nutrition falls mainly in the realm of the health sector. Its planned interventions focus on anaemia reduction among WRA, PW deworming, weekly IFA supplementation for adolescent girls, prevention of iodine deficiency in WRA, and quality of ANC (including providing PW with a health record). To reduce low birth weight (SO2), With regards to MMS, it is stated that there is a need to conduct preliminary studies on MMS among PW as well as to provide them with nutritional supplements (also called "MMS") (p.133 & 136).

e. **Policies, Standards and Protocols on Reproductive Health and Child Survival Services: Food and Nutrition (MSAS, 2018b).** Objective: Provide information on nutrition and hygiene practices to health workers and program managers to support service delivery. This focus of this document is on the fight against micronutrient deficiencies. As such, interventions to reduce the risk of anaemia in pregnancy are recommended namely providing PW with a deworming treatment during the second trimester and IFA according to the following regime: Intermittent IFA supplementation which is one (1) IFA tablet per day (formulation: 60 mg of iron + 400 µg of folic acid) throughout pregnancy and up to 2 months after delivery. If ANC takes place late (late is not defined) during the

pregnancy, provide 2 IFA tablets per day. If anaemia is detected either by the hemoglobin (Hb) test and/or the pallor of palms and of mucous membranes, the following treatment is recommended according to the seriousness of the anaemia: a) light anaemia (Hb ≥10 et <11mg/dl): 60 mg of iron and 400 ug of folic acid for the entire pregnancy and a two-month period after delivery, b) moderate anaemia (Hb ≥7 et <10mg/dl): 120 mg of iron and 400 ug of folic acid for the entire pregnancy and a two-month period after delivery, c) severe anaemia (< 7 mg/dl): 120 mg+400 µg/ day, for three month and pursue the preventive treatment. Blood transfusion if necessary.

f. **Policies, Standards and Protocols for Reproductive and Child Survival Services: Maternal, Perinatal and Neonatal Health (MSAS, 2018a).** Objective: Pregnancy, childbirth and post-partum monitoring to help women carry a pregnancy to term under the best possible conditions and to ensure smooth childbirth and post-partum periods. Standards relating to the content of each of the recommended four (4) ANC contacts are described. Provision of IFA supplementation as well as of nutrition advice ("conseils sur la nutrition") is recommended at each ANC. If clinical anaemia is detected, a complete blood count (CBC) is an option at the second ANC. Moreover, if the woman suffer from moderate anaemia (Hb between 7-11g/dl or if she shows pallor of mucous membranes or palms), according to the protocol, she must be given 120 mg of iron, 400 ug of folic acid combined with vitamin C for a six-month period. If the PW suffers from severe anaemia (Hb < 7g/dl), a blood transfusion should be provided. These guidelines are in line with the results from the field interviews conducted with health providers. However, they are slightly different from the Policies, Standards and Protocols on Food and Nutrition (previous section) with regards to the definitions and units of Hb measurement for anaemia.

g. **National Health and Social Development Plan/PNDSS, 2019-2028 (MSAS, 2019).** Objective: The plan aims at universal health coverage in Senegal. It is focusing on three major areas: (i) sector's governance and financing; (ii) delivery of health and social services; and (iii) sector's social protection. The plan has many action lines, two of which (lines 31 & 33) focus respectively on: i) improving the availability and accessibility of an integrated service package for mother and child, and; ii) improving the availability of quality pharmaceuticals and other essential products throughout the health pyramid. In this document, Senegal's supply chain for IFA and other pharmaceuticals is described on p. 37-38 of the PNDSS).

h. **Strategic plan for maternal, newborn, child and adolescent health and nutrition (PSI-SRMINIA_N), 2024-2028 (MSAS, 2024)** It is expected that this plan will generate some impact by 2028, namely reducing anaemia among WRA, by providing IFA supplementation to all PW (100%) and by improving maternal nutrition.

i. **National infant and young child food policy (MSAS, 2013).** Because there is a lack of information available to women lack information on optimal dietary practices during pregnancy and breastfeeding, as well as for a child's first two years of life, this policy focus on the following priority actions: i) Ensure adequate micronutrient supplementation for women (e.g. iron, folic acid and calcium for PW); ii) Ensure deworming of women in the 2nd trimester of pregnancy; and, iii) Build the capacity of healthcare staff regarding dietary practices for infants and young children, nutrition for pregnant and breastfeeding women, integrated management of childhood illnesses (IMCI) and hygiene practices. The strategy implementation training guide (MSAS, unknown year) includes a number of indicators for which a monthly report of ANC data is required, specifically regarding the proportion of PW receiving nutrition education on the importance of nutrition for a healthy pregnancy and the number of PW who have received an IFA prescription.

j. **National strategic plan on community health, 2014-2018 (MSAS, 2014)** Objectives: i) To improve coverage and quality of community health services; ii) To strengthen community participation in health problem solving; and, iii) To ensure the sustainability of community interventions. The plan defines responsibilities of every community health actor (e.g. *relais*, *Bajenu gox*, health community agent). As such, the health community agents are responsible for providing IFA tablets to pregnant women while the *Bajenu Gox* and other community health actors are responsible for making home visits to PW and upholding census information on PW in the community as well as promoting the completion of the four ANC visits. Some challenges related to community health actors are highlighted, such as limited and non-standardized training. Coordination mechanisms are proposed to ensure the optimal implementation of the plan, which requires an investment of 27 billion CFA francs. There is no indicator on maternal nutrition including on IFA supplementation.

k. **CNDN's Nutrition Strengthening Program.** Objectives: i) Improve the growth of children aged 0-5 living in poor urban and rural areas of Senegal, and ii) Strengthen institutional and organizational capacity to implement and evaluate nutrition interventions.

l. **Food and Nutrition Division's Nutrition Program.** This program applies to healthcare facilities. Through cooperation with other ministries and technical and financial partners, this program develops and implements national food and nutrition policies.

m. **Program on food fortification (2017-2021).** This focus of this plan is on iodine fortification of the salt as well as the addition of iron and folic acid to flour and of vitamin A in cooking oil.

During field visits, various ANC workers (midwives, RMHs, RH and Nutrition Officers) mentioned that they referred to the documents on Policies, Standards and Protocols (the one on Maternal, Perinatal and Neonatal Health and the one on Food and Nutrition) for guidance when offering ANC services. Electronic copies were available, but no hard copies were seen. However, most people reported that health providers did not use these documents systematically, although they could be used during supervision.

PILLAR 1 – POLICIES AND PROTOCOLS

Summary of Opportunities	Summary of Challenges
• Several policies, standards and protocols are available to guide and implement ANC consultations, including MMS supplementation.	• If there is a transition from IFA to MMS, relevant policies, norms and protocols (as listed above) will need to be reviewed. To do so, a clear process should be implemented and understood by all stakeholders to move forward efficiently.
• Anaemia in PW and the poor quality of their diet are perceived as major nutritional problems as well as non-use of available and local food products due to lack of knowledge.	• Recommendations on anaemia detection and treatment are different across policies and protocols documents and need to be harmonized. This is particularly important in the context of a transition to MMS.
• The MSNP can be used to advocate for improved coordination mechanism between sectors at central level.	

PILLAR 2 - SERVICE DELIVERY

Staff distribution

The Civil Service Ministry is responsible for recruiting health staff to be deployed at health facilities, and hiring is normally made on an as-needed basis. Local councils or health development committees can also hire midwives. According to the 2019 Health Map data (ANSD, 2020), the government recruits 72% of midwives, 57% of nurses and 47% of doctors working in health facilities (MSAS, 2020).

Senegal's 2019 economic and social status assessment revealed that healthcare staff distribution in the country is not optimal. While only 22% of the country's population lives in the Dakar region, more than a third (36%) of health providers work there. Data provided by the National Plan on Human Resources Development for Health 2009–2018 indicate that half of health worker labour force is in Dakar (Kandé, 2021). More recent data show, that of the 1,441 midwives (total estimated national workforce) spread across all health posts, 19% work in the Dakar region, compared with 13% in Thiès (ANSD, 2020). The distribution of midwives in health centres follows a similar pattern: of their 744 midwives, 38% work in Dakar and 11% in Thiès (ANSD, 2020). The distribution of specialized doctors is more critical. As a result, the ratio of health personnel to population — specifically the WRA-to-midwife — is not uniform across regions (MSAS, 2020). The Kolda, Diourbel, Sédhiou and Kaolack regions have the highest WRA-to-midwife ratio, while the Kédougou, Ziguinchor and Dakar regions have the lowest. Also of note, 88% of gynaecologists are in Dakar (MSAS, 2020). The 2019 Health Map documentation proposes to review the distribution of healthcare staff (supported by the country's Midwifery Association), as well as maternal, neonatal and infant and child healthcare equipment and supply. The Midwifery Association's president goes even further, seeking a redistribution of midwives according to their experience in each facility to maintain motivation. To do so, a mapping exercise of the actual workforce distribution could be useful.

Table 6. Demographic ratios of healthcare providers by region (MSAS, 2020).

Region	WRA-to-State midwife ratio	Population-to-State Nurse ratio	Population-to-medical doctor ratio
DAKAR	1245	1716	3962
DIOURBEL	1925	4621	16234
FATICK	1364	3468	23523
KAFFRINE	1292	3953	37029
KAOLACK	1632	4083	31228
KÉDOUGOU	945	2393	23035
KOLDA	2229	4828	39829
LOUGA	1433	3477	20248
MATAM	1514	3362	21395
SAINT-LOUIS	1473	3272	12661
SÉDHIOU	1660	5586	46084
TAMBACOUNDA	1441	3380	23375
THIÈS	1578	3600	20644
ZIGUINCHOR	1061	1502	10511
SENEGAL	1444	2831	10424
WHO standard	N/A	N/A	10000

Positions dedicated to maternal health and nutrition were filled in all the regions covered in the LA. Regional and district management teams all have reproductive health coordinators, usually a midwife experienced in providing maternal care. Virtually all the facilities that are supposed to offer ANC have qualified midwives to provide the service.

As a result of the doubling-up policy, known in the system as a “winning duo”, virtually all health posts have a midwife and a nurse who can both provide general maternal care services and ANC. Traditionally, chiefs of health posts were nurses, but administrative modifications were noticed with health posts managed by midwives, enabling improvement of ANC supply in considered health posts. However, since a few health posts do not yet have a midwife, there is no “doubling up” as it is the case for 22 health posts in Kolda region.

To fill gaps and ensure adequate health facility staffing, staff was hired so that each facility has at least one midwife and one nurse. This was achieved thanks to the Innovation for Maternal and Child Health in Africa (ISMEA) project, which is in place in Kaffrine, Kolda, Ziguinchor, Tambacounda, Kédougou and Sédhiou. For details on the ISMEA project, please see Appendix 1. When conducting the field data collection in Kaffrine, the district staff list showed that the ISMEA project had contracted approximately 30% of the staff. While many welcome this support (RMH, DMH, Midwifery Association president, TFP), some question the initiative's sustainability. However, the plan is for these staff to transition to the public service at the end of the project. A consensus has been reached about this transfer to public services as well as their engagement to serve and stay in their current location for at least two years.

The absence of a midwife despite the presence of a qualified male ANC provider raises other problems in the delivery of ANC. It can lead to reluctance on the part of some PW or their husbands to allow a man to examine their wives. Moreover, cultural barriers may prevent some male nurses from carrying out certain examinations on women (such as touching). This reluctance must be examined in greater depth.

Staff capacity

The Senegal's National School on Health and Social Development (or École nationale de développement sanitaire et social/ENDSS) which is attached to Université Cheikh Anta Diop (UCAD) provides initial training for midwives and nurses. Created by decree in 1992, this institution is the largest public training school for midwives and nurses in the country. It offers a three-year training program (of which approximately 60% is devoted to practical training) for midwives. Both theory and practice are part of the training curriculum. The midwifery program includes components on community and reproductive health, as well as on nursing. There is also a general module on nutrition. It highlights the importance of IFA supplementation during pregnancy and provides guidelines to follow. However, although there is some general nutrition content in the training curriculum, the president of Senegal's Midwifery Association thinks the maternal nutrition component needs to be strengthened. Of note, once the academic phase is completed, each student has to pass a professional entrance exam. On average, between 800 and 1,000 candidates sit the exam each year, but the failure rate is 80%, which only leaves 200 trained midwives to be deployed annually. All midwives trained either in ENDSS or in private schools are requested to complete the same final exam, which is called the State Diploma. In case of failure, the midwives trained in private schools are only granted with their school diplomas, and not the State Diploma.

Some private schools offer midwifery and nursing training. One of them, the *Institut de formation en administration des affaires*, even offers a senior technical licence in dietetics focusing on clinical nutrition (e.g. diet and menu development, food quality) as well as training to become state midwives and nurses.

Staff who distribute IFA directly to PW — such as health centre/district pharmacists and health post medicine warehouse attendants — either have a pharmacology doctorate (pharmacists) or secondary education followed by specific training as warehouse attendants (staff in health posts).

Once training is complete, health personnel, such as midwives are assigned to a health facility. They should receive formative supervision regularly, as recommended in the Policies, Standards and Protocols (p.33, MSAS, 2018c), using the supervision tools provided (e.g. grids, standards). Table 7 provides the recommended schedule for supervision.

Table 7. Supervision schedule by level (MSAS, 2018c).

	SERVICE LEVEL			
SUPERVISION	**Health Hut**	**Health Post**	**District**	**Region**
Frequency	Once per month	Every 2 months at least	Every 3 months at least	Every 6 months at least
Supervisor	Health post team	District team	Regional team (manager)	National team

In addition, ongoing training should be provided to health personnel to maintain quality ANC. According to the document on Policies, Standards and Protocols - General Elements (MSAS, 2018c), stakeholders involved in reproductive health and child survival (RHCS) services should develop training plans based on the national training program and should implement strategies to engage and motivate staff. The document also defines learning success criteria. Trainers should have followed the training-of-trainers program in their specific areas, have at least two years of field experience in RHCS services and have received adult training skills. A follow-up with trainees must be conducted within three months of completing their training courses.

Despite the aforementioned recommendations, data from the 2019 report of the Agence Nationale de la Statistique et de la Démographie (ANSD & ICF, 2020) on healthcare service delivery shows that staff at health facilities had not received ANC training in the 24 months prior to the survey (Table 8). Despite its larger population, the Dakar region generally had the lowest proportion of trained staff, followed by Kaolack, Louga, Thiès and Ziguinchor. Fatick, Thiès and Sédhiou had the lowest percentage of staff trained in providing advice to pregnant women. St-Louis emerged as the region with the lowest proportion of health providers having been supervised in the last six months.

Table 8. Proportion (%) of staff trained in antenatal care, counselling pregnant women and having been supervised in the last six months.

Region	% of staff trained in antenatal consultations[1]	% of staff trained in antenatal care in the past 24 months[2]	% of staff trained in counselling PW in the past 24 months[3]	% of staff supervised in the past 6 months[4]
Dakar	48.5	43.9	26.5	71.7
Diourbel	94.5	62.8	18.4	81.7
Fatick	74.1	54.5	0.6	87.8
Kaffrine	97.0	65.4	16.9	85.3
Kaolack	60.9	55.5	21.1	86.8
Kédougou	90.0	81.3	18.7	87.3

Kolda	73.7	58.0	21.5	63.1
Louga	65.8	42.0	12.9	67.3
Matam	72.7	73.3	31.4	81.8
St-Louis	93.3	59.3	25.8	50.7
Sédhiou	70.2	51.8	5.3	88.2
Tambacounda	67.7	57.6	18.1	91.2
Thiès	57.3	41.2	8.2	71.1
Ziguinchor	65.2	54.7	13.2	86.9
Total	68.1	52.9	17.8	75.3

[1] At least one staff member providing ANC services at health facilities (excluding health huts) indicated they had received ongoing training in antenatal care in the 24 months prior to the survey. Training must include structured sessions; it does not include individual instructions received during routine supervision.

[2] Interviewed staff having received ongoing training on ANC in the past 24 months.

[3] Staff providing antenatal consultations stating they had received ongoing training in counselling pregnant women.

[4] Staff who received formative supervision (any form of technical assistance or supervision from a facility-based or visiting supervisor). This may include reviewing records and observing work, with or without feedback to the health worker.

ANSD & ICF data reveal than 52.3% of hospitals, 76.4% of health centres and 68.1% of health posts had at least one staff member trained in ANC (ANSD & ICF, 2020).

In Kolda region, Ningue et al. (2020) found that between 50 and 69% of ANC providers (n=27) had received training in maternal nutrition in recent years, while less than 50% had received ongoing training in IFA supplementation and micronutrient deficiencies. Less than 30% were trained on calcium supplementation.

During the LA field visits, few ANC providers (midwives and nurses) indicated having received training in ANC (1/10) or maternal nutrition (1/10) in the last two years. Results of a study investigating barriers and enablers for improved coverage and utilization of IFA in seven countries including Senegal has also revealed a lack of IFA supplementation-specific training and capacity gaps among health workers of all countries (Siekmans et al., 2018).

Supervision seems to be carried out on a regular basis as district and regional teams visited health centres and posts at least two to three times a year. In the districts surveyed, there was a system in place to integrate and train new midwives, namely those contracted under the ISMEA project. As soon as the new midwives arrive in their assigned area, midwives already working at the health centre take them under their wing before they get deployed to health posts. However, because of staff shortages in certain posts, new midwives may be deployed more quickly, which shortens the time to train them.

ANC availability

Health centres and health posts offer ANC. Staff in health posts also provide ANC as part of outreach strategies in health huts, where it is usually conducted by midwives monthly. This allows them to meet PW who would otherwise not be able to access care in health facility due to remote

location, financial barriers or geographical and logistical constraints (isolation and transportation especially during the rainy season). During field visits, the team also noted cross-border use of ANC, particularly in Kolda region, where some women access ANC in Gambia. ANC is also sometimes offered on public market days. Although there are annual maternal and child health weeks, ANC is not included in these events, as they focus mainly on raising awareness of specific maternal and child health problems (theme-based) and not necessarily on ANC or nutrition.

As for physical access to a health facility, data from the 2019 Health Map (MSAS, 2020) reveals Thiès has the country's highest proportion of health posts (12% or 1,478 in 2019), while Sédhiou has the lowest (4%). Dakar still leads the way for health centres (23% for a total of 99), while Kédougou and Sédhiou were in last position (3%). Populations living in Kédougou and Tambacounda regions have the longest distances to cover to reach a health post (between 10km and 12 km) while those living in the Matam region have the longest distance to cover to get to a health centre (48 km). Dakar offered the shortest distance to health facilities (approx. 3 km). As shown in the Siekmans et al. (2018) study, the geographic accessibility to health facilities is among the more commonly reported barrier to IFA supplementation in several African countries, including Senegal.

In terms of overall service level, 83.5% of hospitals, 79.3% of health centres and 76.2% of health posts offer ANC. In addition, the Policies, standards and protocols (general elements) document states that "health facilities must provide access to reproductive health and child survival services to clients every day during working hours." The Ningue et al. (2020) study shows that over 90% of the facilities visited in Kolda were open every day of the week; however, it seems that there were specific times allocated to ANC (e.g. 8:00 AM–12:00 PM). The data collected during the LA showed that health centres and posts offered ANC every day of the week, usually between 8:00AM and 4:00PM.

ANCs also provide a referral service to a more specialized facility in situations where a midwife considers it advisable, having assessed certain parameters. Examples include PW of small stature, those who have had a caesarean section, PW with less than 28 cm uterine height at the end of pregnancy, a breech fetus presentation in first pregnancy, or any PW with a fetus positioned sideways.

Quality of ANC services

According to the Policies, Standards and Protocols document on General Elements (MSAS, 2018c), the state nurse, midwife, doctor, gynaecologist, community health worker and social worker are all authorized to provide pregnancy monitoring, childbirth and family planning services after having followed appropriate training (p. 31). In the Kolda region, Ningue et al. (2020) found that midwives were offered ANC in about 75 % of the facilities. The LA field visits confirmed midwives were indeed the main ANC providers, with some back-up provided by nurses especially in health posts where "the winning duo" system was in place. In several facilities, midwives also received support from matrons who mainly took vital signs (such as weight, height, brachial circumference and blood pressure) before the PW meets with the midwife. According to several RMHs, DMHs and midwives, this reduces the workload of midwives who also provide family planning and delivery services as well as performing ANC.

In addition to staff qualification requirements, the Policies, Standards and Protocols for Reproductive and Child Survival Services: Maternal, Perinatal and Neonatal Health (MSAS, 2018a) provide guidelines (protocols) on the content of each of the four ANC visits, which include prescription of IFA tablets (p. 65) and content (e.g. clinical actions, verbal assessments, tests, intake and staff attitude) for each ANC consultation.

During the field data collection, the information gathered from midwives and head nurses reveals that ANC quality components include — in order of importance — welcoming PW and verbal assessment of their status, followed by clinical actions, prescription of IFA and a check-up (which includes an Hb test). If calcium deficiency is suspected, a test (which involves a fee) will be recommended to assess her calcium status. ANC visits generally last between 15 and 30 minutes (particularly for first pregnancies), but some providers indicated they would take all the time needed to ensure a high-quality ANC. ANCs also emphasize the importance of tests, and include advice on nutrition, medication and prevention of pregnancy-related complications.

At her first antenatal consultation (usually at the third month or later), a PW will be prescribed IFA (one tablet per day). However, if the Hb test reveals a mild or moderate anaemia (Hb between 7 and 11 g/dl), the woman will be prescribed two IFA tablets daily. When severe anaemia is present (Hb below 7 g/dl), she will be referred to the health centre for a blood transfusion. In case of a delay for the first ANC visit, women will not receive more IFA — in other words, there is no catch-up. After childbirth, women will receive IFA for a period of 30–42 days. If a calcium deficiency is suspected, supplements will be prescribed from the 20th week. Deworming medication is prescribed during the second trimester of pregnancy.

Women can get the prescribed IFA tablets and the deworming drug from warehouses and pharmacies in health posts and centres. IFA may occasionally be given to PW in health huts as part of outreach strategies. Hb tests are carried out at health centres, as health posts do not have the necessary equipment. There is a fee for both the tests and medicine prescriptions.

In line with findings from Siekmans et al. (2018), information collected during field visits also reveal that PW are not systematically offered any specific individual behaviour change activities to ensure they take the IFA supplements. Providers simply recommend their use, without necessarily addressing the factors that limit their uptake. As a result, several health providers mentioned many PW do not adhere to the IFA regimen. The reasons midwives provided for IFA non-compliance are mainly side effects like the taste, nausea, etc. As well, some midwives pointed to shortage of IFA in health structures such as Bamako Initiative (IB) pharmacies, leading to midwives writing prescriptions for IFA in pharmacies where the cost of IFA is higher.

Moreover, ANC providers do not have in-depth knowledge of nutrition for PW to effectively answer questions raised by PW during visits. Most midwives have expressed the need for more training in this regard. The same applies to the regional focal points for health education and communication workers who — like some regional supervisors of child survival, food and nutrition — are trained on the job and gather additional knowledge by consulting nutritionists' blogs or books that are not necessarily evidence-based or adapted to the context. Some even try to source nutrition information from the radio because they feel they do not have all the relevant knowledge they need. They also expressed needs for training to develop their communication skills.

To overcome the challenge related to IFA intake and ensure that each PW attends all ANC consultations, the *Bajenu Gox* are called in at community level to act as a link between the health post or centre and the PW and her family. Through home visits and talks, they stress the importance of ANC and IFA supplementation, they follow up with women who did not attend their ANC appointment, and raise awareness among spouses or husbands, religious leaders and mothers-in-law so that they can motivate pregnant women to attend ANC and take the IFA.

As well as the *Bajenu Gox*, community health agents (including the *relais*) are also involved in the provision of behaviour change interventions. According to the Policies, Norms and Protocols document: General Elements (MSAS, 2018c), community health agents may also provide IFA tablets to PW but this recommendation is not operational. This is unfortunate given the fact that the distribution of IFA at community level seems to facilitate the IFA adherence and coverage

(Siekmans et al., 2018). This represents a missed opportunity, as community platforms provide opportunities to improve access to IFA refills and counseling on side effects and on the importance of taking IFA, both of which can contribute to increased IFA use among women (Verney et al., 2018).

In addition to the advice on maternal nutrition and IFA supplementation offered during individual ANC, midwives also hold group talks on these topics. However, individual counseling isn't done systematically, and neither is the provision of nutrition advice. During the field visits, only a small amount of material in support of behaviour change on maternal nutrition and IFA supplementation — mainly flipcharts (especially in Kolda) — were available in health facilities. Several providers mentioned that they did not have enough materials. Many midwives used the section on general advice on maternal nutrition found in the PW's health booklet instead, which simply recommends "taking the indicated amount of IFA."

The study by Ningue et al. (2021), which compared observed and reported antenatal nutrition service practices, corroborates the previous information and sheds further light on the subject. Their research results showed that about 85% of providers (n=27, direct observation of 54 ANC consultations) checked for signs of anaemia during ANC consultations. There was no difference between the results from self-reporting and direct observations. A large proportion of providers (89%) reported asking PW if they were taking IFA, whereas when observed, the proportion was only 44%. Furthermore, direct observations revealed that none of the providers (0%) asked if the woman had experienced side effects from taking IFA, whereas 33% self-reported that they did. However, during the time of ANC dedicated to nutrition advice, about 80% of the providers explained the importance of taking IFA, which was the same percentage as direct observation and in self-reported practices. Almost 100% explained the potential effects of taking IFA during ANC visits when they were observed, whereas only 33% reported doing so. During observations, 15% of providers asked women if they were taking iodized salt, whereas 33% reported asking it. In addition, when observing counseling, 18% stressed the importance of using iodized salt.

To sum up, when midwives were asked how they perform ANC, the LA results show that they seem to be well trained considering the following description of an ANC consultation handled by a midwife:

"As soon as the woman comes in, we welcome her, invite her to sit down, ask her first and last names, and the purpose of her visit. If this is the first ANC contact, we take the time to do a thorough interview, asking her first name, surname, age, address, marital status, husband's name, address and age. We cover family and medical history. We also ask about the number of pregnancies and the number of births, and then, we do a complete physical exam. We look at her hair and then at her mouth to check for dental decay, and do a breast exam. We do an abdominal palpation to check for flexibility, stretch marks or laparotomy scars. The calves are checked for flexibility. The height of the uterus is measured … We also look for any vaginal discharge and finish with the vaginal examination (…) to check the position of the cervix, the flexibility of the opening, and so on. After recording everything, we suggest an HIV screening test. After the test, we administer a tetanus vaccine and we record everything on the file and in her booklet. She then gets an appointment for a check-up and an ultrasound to be done prior to her next consultation, and we give her a prescription for medication (IFA). We also prescribe vitamin C to help bind the iron." (A midwife's description of an ANC consultation).

Nutritionists in the healthcare system

In Senegal, the public service does not recognize the profession of nutritionist. This impacts their presence at all levels (Deussom et al., 2018), limits the ability to raise awareness among stakeholders and prevents the integration of nutrition both vertically and horizontally (Ruel-Bergeron, 2018), a finding also raised during the LA.

In 2018, there were eight people working in the Food and Nutrition Division of the Health and Social Action Ministry, including three nutrition technicians. There was no senior nutrition staff. Yet, there were more people working at the National Executive Office of the National Council on Nutrition Development (CNDN). Of the 46 CNDN National Executive Office employees on file in 2018, only four specialized in nutrition and health policy. In addition, few nutritionists are working for technical and financial partners.

To strengthen nutrition, the MSNP 2024–2028 includes a specific focus on training, research and innovation. The plan is to train nutrition specialists at graduate, master and doctoral levels. Also in the plans is a continuing training program tailored to various sectors' priority needs, as is the introduction of institutional measures to create a budget line for regional nutritionists.

It would be suitable to train and recruit more nutritionists. The Cheikh Anta Diop University currently offers two programs in food and human nutrition: Master I (2 semesters of 30 credits each) and Master II (additional 2 semesters of 30 credits each after the completion of Master I). Out of these 120 credits, 14 are dedicated to public nutrition-related courses and 36 to research (dissertation and research methods). Two other three-credit courses focus on maternal milk production measurement and behavioural change communication. The new Sine Saloum university (Université du Sine Saloum) also offers two bachelor (licence) nutrition programs: a) Nutrition and food science and b) Human nutrition and dietetics.

A critical problem identified is that not all focal points on child survival, food and nutrition in medical regions and districts are trained nutritionists. They require additional training to perform their tasks effectively.

Health information system

The DHIS2 is the main health information system in Senegal. It provides data on ANC and other services. Every month, health facilities transfer data from the ANC register into the software with regard to the following indicators: 1) ANC utilization rate (any contact for ANC), 2) ANC completion rate (i.e. PW who have attended at least four ANC consultations), 3) adequate ANC coverage rate (i.e. PW who had an ANC consultation in each trimester and an ANC visit during the ninth month of pregnancy), 4) # of PW to whom IFA was prescribed. The DHIS2 does not collect any data on deworming. Moreover, there is currently no information in the system on nutrition advice provided to PW. However, information on this intervention may be available in the near future as an indicator on maternal nutrition advice has been added in the new (2023) health facility's ANC register.

Supervisors use grids to monitor each program indicator during supervision. In addition, zone reports (i.e. area covered by a health facility) are prepared quarterly and sent up to the next administrative level (e.g. from the health post to the district). It is also important to underline that the supervision is typically focused on certain aspects, which differ from one supervision to another.

Unfortunately, since September-October 2022, health facilities are retaining health data and as a result, the DHIS2 contains no information on ANC. The monthly reports are completed on paper and kept at the facility level. An interim compromise was devised, where district chief medical officers tried to convince health providers to fill in the reports correctly and to keep them. They hoped that this would end the practice of withholding information, and that the information would be shared.

In addition to the health information system, DHS are conducted on a regular basis. For instance, between 2012 and 2019, continuous DHS were carried out every year. During these surveys, data may be collected on ANC services, including IFA supplementation and deworming among PW. Similarly, the national statistics and demography agency (ANSD) have been gathering information on the health service delivery system on an annual basis during the same period. The implementation of these national surveys requires significant human resources and financial investments. Unfortunately, these national surveys do not gather information on the provision of nutrition advice and counseling during ANC, and data on IFA supplementation and anaemia are not collected in every survey.

Coordination

Interviews held as part of the LA field process and results from the Deussom et al. (2018) study show the CNDN holds biannual meetings with its partners, which include ministries involved in nutrition specific and nutrition sensitive interventions. However, the liaisons assigned to the CNDN by each ministry lack influence in promoting the nutritional agenda within their organization.

Also, acting on behalf of local authorities, the CNDN coordinates the implementation of nutrition activities conducted by community agencies in their area of interventions. In line with data from the landscape analysis, Deussom et al. (2018) highlighted internal coordination activities of the CNDN, namely quarterly meetings to validate and review the annual action plan and quarterly reviews with the Regional Executive Offices (REO). In turn, REOs hold their own monthly coordination meetings and quarterly reviews with community implementing agencies

According to a World Bank analysis (Ruel-Bergeron, 2018), the lack of high-level commitment curtailed the implementation of the previous MSNP and the same applies to the current MSNP (2024-2028). The CNDN is addressing this challenge, as it aims to play a coordinating role at the national level, particularly through the nutrition group meetings, which included representatives from the government, as well as technical and financial partners.

Meetings of the SUN Movement (including United Nations, civil society, private sector) function as a coordination mechanism, though they are irregular, except for the annual meeting that assesses the SUN Movement progress in Senegal. Additionally, the nutrition group and its ad hoc subcommittee on anaemia hold meetings, but these are also infrequent. These observations are consistent with those of Deussom et al. (2018), who qualified the collaboration between technical and financial partners (TFP) as limited.

In March 2024, a new task force was initiated. Composed of representatives from TFP and the Health and Social Action Ministry, the task force will work specifically on the transition from IFA to MMS. Terms of references for this group have been drafted.

As noted by Deussom et al. (2018) and confirmed during the LA, the Maternal and Child Health Division of the Health and Social Action Ministry organizes weekly internal meetings that are attended by staff from other divisions, such as Food and Nutrition and Maternal and Newborn Health and Child Survival. However, some claim the coordination between the various divisions is less than optimal. Deussom et al. (2018) also highlighted this challenge regarding the Food and Nutrition Division. Similarly, at the United Nations level, each agency follows its mandate, which limits the possibility of implementing coordinated, complementary interventions.

Health district teams are invited to regional quarterly meetings. Health nurses and midwives from health centres and health posts are also invited. Health centres and health posts also hold monthly staff meetings. During these meetings, performance indicator results (especially on ANC)

are presented and reviewed. Actions to resolve problems are also defined. Of note, each invitation is extended to partners present in the area, whether at regional, district or health structure level.

Supervision is conducted in problematic health facilities either monthly or quarterly. Site visits allow supervisors to talk to healthcare providers to identify problems and work on solutions. During the visits, both parties (supervisor and employee) agree on an improvement plan, to which there will be a follow-up. For ANC in particular, supervision teams include reproductive health managers, who take part in regular (quarterly) and formative supervision, thus ensuring quality service delivery.

Partnerships

Appendix 1 provides a description of partners currently involved in maternal nutrition in Senegal.

PILLAR 2 – SERVICE DELIVERY

Summary of Opportunities	Summary of Challenges
Staff capacity:	
• The training curriculum of midwives contains a strong component on maternal and infant care but not on maternal nutrition.	• ANC providers as well as Regional and District focal child survival, food and nutrition officers are not adequately trained on maternal nutrition and behaviour change techniques.
• Recommendations are available on how to ensure optimal supervision and in-service training of health providers.	• ANC providers do not benefit from appropriate follow-up to ensure skill integration.
• At the regional and district level, well-trained pharmacists are available.	• Nutrition service delivery suffers from a lack of resources, especially with regards to staff assigned to the provision of nutrition advice.
• Existence of focal points dedicated to nutrition at a regional and district levels.	• Warehouse attendants do not benefit from a standardized training.
• There are a few universities offering nutrition graduate and undergraduate training.	• Supportive supervision activities are not systematically conducted in each health facility.
• There is a midwives' association which has the potential of becoming a professional order.	• Limited tools are available to support behaviour changes activities.
• There are policies, norms and protocols to guide the provision of ANC.	
• Decentralized coordination and supervision provide opportunities to strengthen health facility providers' skills,	

particularly regarding ANC delivery including IFA supplementation, as well as IFA stock monitoring.	
Staff distribution:	
• There is a midwives' association which can support a mapping exercise to review the distribution of midwives.	• The distribution of midwives in the country is not equitable.
• In 5 regions, the "winning duo" (midwife-nurse) is available in almost every health facility. This duo can contribute to increase availability of ANC.	• Sustainability of ISMEA support not ensured.
• The ISMEA project aims to improve access to quality ANC. This initiative could be integrated into the Universal Health Coverage scheme.	• In-service training and deployment of midwives provided by the ISMEA project is not standardized.
Availability of ANC:	
• ANC consultations are offered in most health facilities.	• ANC is not offered in every health facility.
• ANC consultations are also offered outside of health facilities such as through outreach activities either at the health hut level or in public markets.	• Physical access to health facilities offering ANC varies from one region to another.
• Guidelines on criteria to refer high-risk PW are available.	• The transition from 4 to 8 ANC consultations is perceived as not realistic by health providers and is not officially in place.
• The transition from 4 to 8 ANC consultations could help to increase access to IFA and MMS supplementation.	
• IFA (and MMS) could be distributed by some community health workers.	
Quality of ANC:	
• Midwives (and nurses) are dedicated to offering quality ANC services including micronutrient supplementation.	• Some midwives are overloaded.
• There is good workflow, and the tasks/responsibilities of each provider are organized to facilitate pregnant women's access to ANC. For instance, at the health facility level, there is support provided by other community health workers to midwives to reduce their workload.	• Competencies and knowledge of midwives on nutrition counseling and education as well as on micronutrient supplementation are limited.
• Calcium supplementation is recommended in policies.	• Healthcare provider training on calcium supplementation is low and the program may be underutilized.

• The « Bajenu Gox » are key stakeholders at the community level given their role in ensuring connection between PW and health providers through sensitization activities focusing on the importance of ANC and IFA supplementation. They are also conducting sensitization activities for women husbands, mothers-in-law, to ensure they support PW. • IFA and deworming are prescribed on a regular basis during ANC consultations. • Nutrition training programs are available in some universities. • Nutrition training of health providers is foreseen in the MSNP. • The potential transition from 4 to 8 ANC contacts is an opportunity to improve ANC quality.	• Competencies and knowledge of regional and district focal point on maternal nutrition and behaviour change techniques are limited. • The number of nutritionists is limited in-country.
Health information system:	
• An online health monitoring system is in place and used by health facilities to report health data monthly. • National surveys collecting data on IFA supplementation (≥90 tablets) and deworming activities among PW are conducted on a regular basis. • Monthly data on ANC coverage are normally available (in the absence of the strike) as well as on the number of PW to whom IFA are prescribed. • A new indicator on maternal nutrition advice has been integrated in the 2023 ANC register.	• The strike of health providers is a limitation to the access to ANC data. • DHS do not provide information on IFA supplementation and deworming of PW at the regional level. • No data on maternal nutrition counseling and education are collected either through the health monitoring system or in national surveys. • There is no data collected on deworming among PW in the health monitoring system.
Coordination and partnerships:	
• Meetings involving the different divisions of the MSAS are held. • Meetings involving TFP are held at the national level by the CNDN. • A task force on nutrition and sub task forces on anaemia and MMS are in place at the national level. The later could be used to ensure optimal coordination	• There is no formal mechanism for coordination of maternal nutrition interventions between TFP, and within ministries. • Work in silos (amongst TFP and/or government) persists.

between partners' initiatives related to the transition from IFA to MMS.

- There is a willingness (CNDN and MSAS) to implement and lead coordination mechanisms at the central level.
- A few partners allocate resources in maternal nutrition (see Appendix 1).
- ARP and NSP collaborate and complement each other to ensure the importation and distribution of quality medicines in-country.

PILLAR 3 - PRODUCT AND SUPPLY

The supply chain for medicines (includes IFA) has two streams: a) a public stream, where the NSP provides products to various public health facilities in the country, and b) a private stream managed by private wholesale distributors who supply pharmacy laboratories (Figure 1).

The chain generally operates as follows: (i) medicine and other health product selection, and quantity needed; (ii) medicine purchase and import; (iii) distribution and storage; and (iv) Access to and consumption.

Maternal nutrition product selection and requirements

The National Supply Pharmacy (NSP) selects all medicines centrally. Products that are ordered by the NSP are part of the national list of essential medicines (Agence sénégalaise de règlementation pharmaceutique (ARP), 2024), which is updated every two years. The latest update was in 2022.

Field visits to warehouses and pharmacies confirmed the presence of products included in the list of essential medicines (or similar in terms of composition), namely boxes of 1,000 tablets of a) ferrous fumarate (200 mg) and folic acid (0.25 mg) and b) ferrous sulphate (200 mg) and folic acid (0.25 mg). However, as stated previously, the products do not contain the WHO recommended amount of folic acid for supplementation of PW (0.40 mg). Iron syrup was also available.

The NSP determines IFA stock requirements based on estimates provided by the regional supply pharmacies (RSP). Every RSP averages the use of IFA in each district over the previous three months to determine quantities needed. For their part, districts estimate their IFA requirements based on monthly usage recorded by each health facility. These calculations include IFA sold to PW, to post-partum women and anyone else.

The process to request medications (including IFA) goes through the ErpX3 software, which is primarily available in the districts and health centres. In fact, not all health posts have the software (e.g. Mabo, in Kaffrine region). During the field visits, some people mentioned having to increase their monthly amounts for certain products to have a buffer stock, including IFA, to avoid running out.

When a health facility (such as the Mabo health post) does not have access to the software, a person will take an inventory of the stock at the end of the month, estimate the IFA requirements and place an order. Out-of-date stock will also be identified for destruction and reimbursement. The facility's head nurse will approve the order form. The chairman and the treasurer of the health development committee will then bring it to the district, with or without the head nurse or

the person in charge of the stock, to purchase the product (using a motorbike or ambulance) and then deliver it to the health facility. The IFA will be stored according to their expiration date (product with the nearest expiration date being placed at the front of the shelf, the ones with the longest, behind). The health development committee (or "Comité de développement sanitaire") and the person responsible for the stock will have inspected the product beforehand to verify quality standards (expiration date, adequate quantity/box, breakage). They keep a record of every medication order received, including quantity received and those that have expired.

In addition to the software, each pharmacy and warehouse has an IFA stock monitoring paper form. At the end of each day, they record incoming and outgoing IFA to provide a more accurate picture of the amount in stock. This alternative method of recording information is suitable considering occasional bugs of ErpX3 software used in the supply chain. Moreover, the number of IFA (or any other medicine) sold to each PW is entered throughout the day in the software. For example, during the visit to the Kaffrine health centre warehouse, a person arrived with a prescription. The staff person took the prescription, entered the number of tablets prescribed into the software, which immediately was subtracted from the amount in stock. The selling price for the required quantity was also indicated.

The RSP and the district and health facility warehouses generally order the required amounts monthly. Sometimes though, a health post might get two shipments in a month if it was unable to buy the monthly supply due to a lack of financial resources. There is also an alert system, that notifies the head nurse and the health development commitment when stock reaches a certain level (3 to 4 boxes of IFA remaining) before the end of the month. The alert enables them to place an order to avoid a shortage. The health huts also get a monthly supply of IFA. The community health agent usually picks it up from the health post or the health district, or the midwife will bring it when she comes to the health hut during monthly outreach strategies.

Importation

The NSP mainly orders IFA and other products from Asian suppliers — namely India, South Korea and Pakistan — although there are pharmaceutical production industries in Senegal such as Valdafrique, Institut Pasteur, West Africa Pharma, Teranga Pharma (Pfizer), Medis (Winthrop) and Parentens. During field visits, IFA produced by Medis and imported from India were found on pharmacy and warehouse shelves in several facilities, such as in Kaffrine. As mentioned in Appendix 1, the delay between the order and the reception of medicines ranges from two to three months by boat or 5–20 days by air.

The Senegal Pharmaceutical Regulatory Agency (ARP) that ensures that medicines entering the country for both the public and private streams are of good quality and comply with the national list of essential medicines. The ARP issues market authorizations for each new product. Before a new medication enters the country, the agency ensures that the supplier has a market authorization. Once the shipment has passed through customs, the ARP inspects the products and takes samples for analysis in its laboratory. If the Health and Social Action Ministry wishes to acquire a new product, it has to submit a request (name of the product, amount required, duration of the trial/pilot) to the ARP, which will grant a special authorization for importation. The process from requesting to import a new product and to receiving special authorization takes 90 days. If the trial is successful and decision is made to go to scale, the product will receive a market authorization. To carry out its work, ARP uses Orbus, a computer network that gathers all the documentation for import-export operations, and specifically certificates of origin and product safety (*Ministère du commerce et des PME*, 2024). In addition to validating the quality of imported products, ARP sets in-country medicine prices, which are posted on its website. This information is accessible to the public (*Agence Sénégalaise de règlementation pharmaceutique* website). For example, the price of a box of 1,000 IFA tablets (200 mg of iron fumarate and

0.25 mg folic acid) produced by Medis (Winthrop) is set at 8,363 CFA francs. Finally, the NSP that negotiates prices with suppliers, not the ARP.

For an upcoming research implementation, the NSP can order MMS for the study upon DSME's request.

Distribution and storage

Senegal has a process for distribution of IFA and other medicine (MSAS, 2019). As shown in Figure 4, first, the NSP acquires medicines and distributes them to the 11 RSP (SEMA, 2023). The RSP then supply medicines to pharmacies in the 79 districts, which in turn supply warehouses in health centres and posts. Health huts generally get their IFA from health posts, but those with a nurse on site get their supplies directly from the health district. Health facilities (centres and posts) have warehouses selling medication where they pass on the profit margin. There also is a mobile RSP, which supplies either districts (called *Jegesinaa* meaning "I get closer" and implemented in 42 districts) or the health centres and posts directly (*Yeksinaa*, not yet functional). Districts and health centres or posts pay a fee for the *Jegesinaa* scheme (Figure 2). Of the eight districts visited during the field data collection, Ziguinchor, Kolda and Kaffrine used the *Jegesinaa* distribution system.

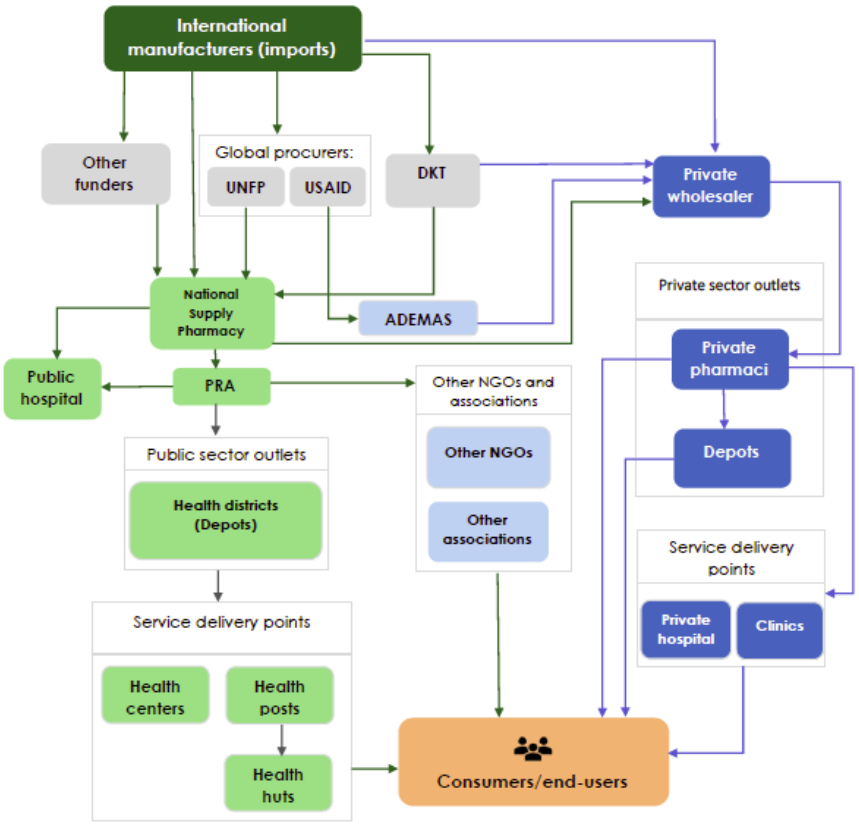


Figure 2.Reproductive Health Sector Supply Chain (SEMA, 2023)

The “Jegesinaa” works as follows. At the end of each month, the RSP brings the IFA to each district. The RSP sells a box of 1000 tablets of IFA to health districts for 5754 CFA francs, an increase of 15% from the price they bought it (5003 CFA francs). PW pay about 100 CFA francs (75-150 CFA francs) for 10 IFA tablets, which means a district pharmacy would make about 10,000 CFA francs from the sale of an entire box of 1000 tablets. At the end of the month, when the RSP calculates the stock used, it will take 15 to 25% of the profit made on the sale of the entire box (i.e. 10,000 - 5,754 CFA francs = 4,246 CFA francs, so between 637 CFA francs and 1,062 CFA francs). The district keeps the remaining amount (3,609 to 3184 CFA francs) for the purchase of new IFA. Delivery time varies from one to three days for both, the RSPs and the health districts pharmacies, but ordering must take placed at least 72 hours before the delivery truck leaves the central level.

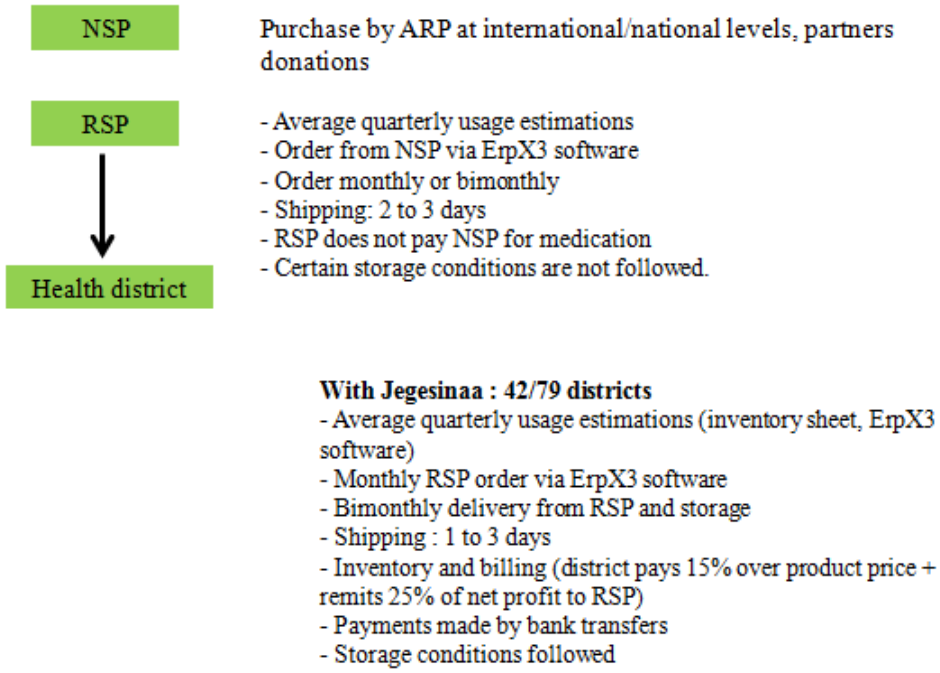


Figure 3. Supply Chain Diagram and Description – RSP to health districts pharmacies.

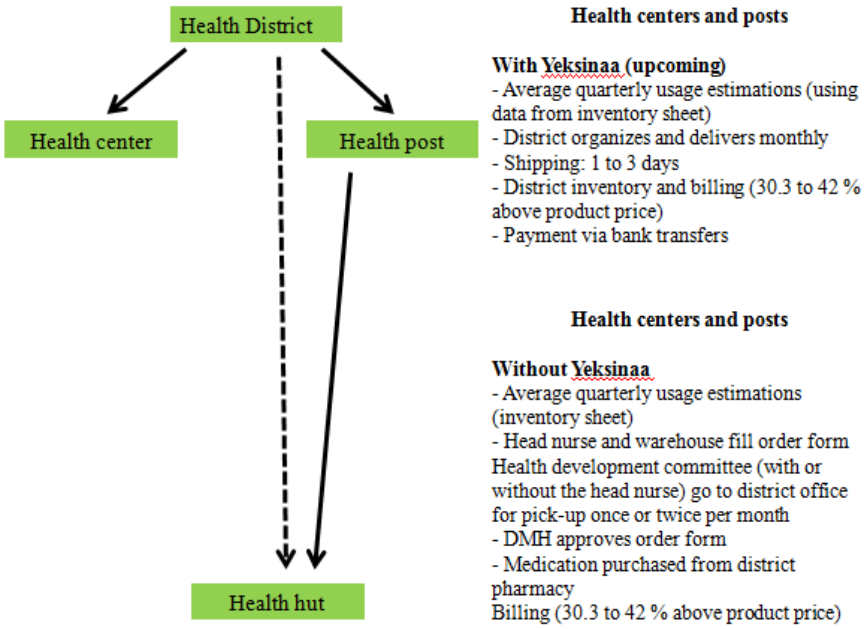


Figure 4. Supply Chain Diagram and Description – Health district pharmacies to health centre warehouses.

None of the facilities used the *Yeksinaa* model during our site visits, and it does not seem to be functional in other parts of the country. In the future, the *Yeksinaa* model is intended to operate similarly to the *Jegesinaa* mechanism, except for the profits, where the district may take between 30.4% and 42% from the health centres and posts, regardless of their geographical location. In other words, if a box of 1,000 IFA tablets generates 4,246 CFA francs in profit, the district will deduct 1,291 CFA francs (30.4% of the minimum profit), leaving the facility with a net profit of 2,955 CFA francs. The price to purchase IFA can vary (75–150 CFA francs) but is generally about 100 CFA francs/10 tablets, regardless of where it is bought (pharmacy, centre or post warehouse). Of note, IFA was free of charge at the Mabo health post.

Health districts, centres and posts may receive annual grants from their local council (e.g. 5 million CFA francs for five health posts in the district of Kolda) to purchase medicines in addition to profits made from medication sales. Medicines may also be donated to a health facility directly by a village or an association. These donations are typically added to the existing stock, as well as to the sales profit. Most sites visited had arrangements with other health posts to cover IFA shortages at their facility — either they purchase a certain amount of IFA from the health post, or they make an exchange (e.g. dewormer in exchange for IFA).

IFA must be stored away from heat and humidity, as clearly stated on IFA box labels observed during field visits to health facilities. Several warehouses (e.g. health posts in Kaffrine and Ouonk) did not have an air-conditioned room in which to store IFA and other products. To preserve IFA tablets freshness, quality and safety, the following storage conditions need to be met: a) a temperature not exceeding 30^{0}C (a threshold easily exceeded, especially in Kaffrine where temperatures in May and June reach 45^{0}C), b) stored in a ventilated location and c) away from sunlight. At RSPs and health districts, IFA tablets were generally stored in air-conditioned rooms, away from sunlight and humidity (although this parameter was not measured). However, the RSP in Kolda did not meet these conditions, nor did any of the health posts. The warehouse attendant of one health post even mentioned the presence of rats in its stockroom. The Ziguinchor district health centre did not have an air-conditioned storage space for IFA either.

When IFA is expired or shows undesirable organoleptic characteristics in health districts (e.g. colour change, presence of a smell), the RSP will collect it for destruction or send it elsewhere, such as another region, if the expiry date is less than three months. If IFA has been expired for more than three months, the district pharmacy will call the district sanitation service to destroy the product, with the cost depending on the amount to be eliminated. In health posts, the expired or unusable IFA is burned or stored in another room and transferred to the district pharmacist during the quarterly supervision.

An analysis of indicators on the availability of essential medicines and other health products in health facilities conducted between 2016 and 2017 highlighted the following points: a) the average availability rate of essential health products rose from 82% to 89% for the period (2016–2017), b) the average shortage duration of essential health products in days was reduced from 31 to 27 days in basic health facilities, but it increased from 36 to 54 days in reference hospital facilities. A more recent study (ANSD, 2020) on healthcare services delivery shows that for all hospitals, health centres and health posts combined, 87% of facilities had iron tablets and folic acid tablets or combined IFA tablets. A similar percentage was observed in all 21 health facilities in Kolda (Ningue et al., 2021). However, only 34% of health huts had IFA on hand. In terms of breakdown, about 70% of hospitals had IFA in stock, compared to 82% for health centres and 88% for health posts. As for Hb testing material, only one health facility out of five (22%) had the required equipment. Finally, the Ningue et al. study (2021) shows that less than 30% of the health facilities sampled in Kolda region had calcium supplements in stock.

Several of the points raised above had previously been pointed out during a participatory evaluation of the IFA supplementation program that was carried out in 2015 (Cheikh Anta Diop & Moncton Universities, 2015).

Access to and consumption of MMS

During ANC consultations, PW receive an IFA prescription from the midwife that covers the period until the following ANC visit (usually 30 days). Women buy the IFA at the health post warehouse or the health centre pharmacy. In the event of a stock-out of IFA tablets, two bottles of iron syrup — which does not contain folic acid (Photos 3a&b) —are prescribed. This dosage adjustment is based on the fact that the syrup form is primarily intended for children. PW appear to prefer these two forms (tablet and syrup) (Siekmans et al., 2018).

According to the midwives and matrons[5] interviewed during the field visits, women generally buy the prescribed IFA. If the PW does not have the financial means to pay for it, she will either be referred to the social assistance service (usually located within the health centre), or the midwife and the health nurse will cover the cost. In some areas, a mutual health insurance scheme allows women to have certain treatments and medicines free of charge, but the IFA fees, deworming and the cost of the ANC consultation were either not or only partially covered (80% of the cost covered) (e.g., two health posts in Kaffrine). As highlighted by Siekmans et al. (2018), the high cost of the ANC consultation is a major barrier for pregnant women in Senegal, despite the low price of IFA tablets compared to the consultation.

Siekmans et al., (2018) also pointed out that many women wait to have their first ANC consultation at the end of the first trimester or the beginning of the second trimester. This means they do not benefit from supplementation throughout the entire prenatal period. They may also not attend the recommended four ANC contacts, which further limits their IFA intake. This is particularly unfortunate as it has been shown that completing four ANC visits is linked to higher adherence to IFA among Senegalese women (Karyadi et al., 2023; Ba et al., 2019; Verney et al., 2018).

According to the information gathered during field interviews with health providers (e.g. midwives), PW report side effects (vomiting and diarrhoea) associated with taking IFA. Women have also misconceptions about IFA supplementation and its benefits during pregnancy. Although they recognize IFA as useful for restoring blood, preventing complications during delivery and providing strength, its role in preventing or treating asymptomatic anaemia seems to be less understood or important for them (Siekmans et al., 2018). It has also been shown that women in Senegal are reluctant to reveal their pregnancy as they believe this may put the fetus at risk. Others believe that ANC visits are only necessary for addressing health issues, so they choose not to attend them if they feel that their pregnancy is healthy (Siekmans et al., 2018).

[5] The "matron" is a community volunteer who has received training and who is responsible for assisting women during pregnancy, labour, childbirth and postpartum (compliance with prenatal consultations, referral of women to ensure assistance by skilled staff during delivery).

PILLAR 3 – PRODUCT AND SUPPLY

Summary of Opportunities	Summary of Challenges
• Both, "Jegesinaa" and "Yeksinaa" mechanisms have the potential to provide IFA/MMS on a regular basis and prevent stock outs.	• IFA stock out at central level has consequences at the district and health facilities: during field visits, about 30% of pharmacies/warehouses did not have IFA tablets (although iron syrup was available). In all four (4) regions, shortage of IFA tablets in the past year was reported.
• Health structures use creative solutions to prevent stock outs.	
• The cost of IFA tablets does not seem to be a barrier to their purchase.	• Bugs of the ErpX3 software encountered. Power outages curtail its operation and can affect supply. Not available at all districts/health centers.
• Some districts and health centers have access to an online system (ErpX3) to place orders of IFA.	• The end-user price of IFA tablet varies across regions.
• Pharmacists and warehouses attendants are generally well trained on storage conditions.	• IFA tablets currently available in pharmacies and warehouses do not contain enough folic acid.
• Availability of guidelines on storage of medicines.	• Training of warehouse attendants not standardized.
• Scaling up ErpX3 in all health facilities could improve stock management.	• Storage conditions of medicines not always optimal.
• Potential for local procurement of IFA/MMS.	• Reluctance by health providers to have bottles for MMS supplementation.

PILLAR 4 - FINANCING

Nutrition Budget

Results from field visits carried out in four (4) regions showed there was no specific line allocation for nutrition in regional, district or other budgets. The same applies at the national level: the Food and Nutrition Division has no financial autonomy, and their budget allocation depends on that of their ministry (Deussom et al., 2018). Maternal nutrition activities such as ANC and IFA supplementation are part of the overall reproductive health budget allocated nationally.

However, the literature review provided some data on previous nutrition budget requirements or allocations in Senegal. This information can be found in the following documents.

Senegal's multisectoral strategic nutrition plan/MSNP (CNDN, 2024)

- 1,536.8 billion CFA francs is required for the MSNP implementation (four years duration) plus an additional 315.4 billion.
- 38 million CFA francs has been earmarked for objective 2 of the plan, reducing low birth weight. It includes 28 million for nutrition specific activities.

- 4,918 million CFA francs has been earmarked for objective 5, reducing anaemia. It includes 3,378 million for nutrition specific activities.
- 67,904 million CFA francs has been earmarked for objective 6, reducing other micronutrient deficiencies. It includes 994 million for nutrition specific activities.
- A large share of the budget (44%) is allocated to preventing and treating chronic and acute malnutrition.
- 11% of the budget is allocated to combating micronutrient deficiencies and 14% to training.
- 46% of the budget is earmarked for nutrition specific activities (699.4 million) and 54% (837.4 million) for so-called nutrition sensitive interventions.
- Health ministry is supposed to receive 60% of the MSNP planned budget, followed by the Local Authorities, Planning and Territorial Development Ministry[6] (34%).

A meeting with the CNDN revealed that there is a specific budget line for nutrition in the Prime Minister's Office budget. For the 2024 year, the actual amount is approximately 1.2 billion CFA francs out of the 7 billion CNDN total annual budget. About 80% of the funding for its implementation comes from GFF and World Bank loans, which are channelled through ISMEA and PIPAEDS.

Unfortunately, domestic resources allocated to nutrition are insufficient and it is difficult to track this expenditure at ministry level.

Financing of reproductive, maternal and neonatal health and nutrition study in Senegal (Béhanzin et al., 2021)

The study aimed at describing trends in health financing of reproductive, maternal, neonatal health and nutrition (RMNHN) in Senegal. The report analyzes the level and trends in spending on RMNHN, and then to further analyse the equity and effectiveness of RMNHN spending in Senegal, over an eight-year period (2014-2021).

Main results:

- As a proportion of GDP, healthcare expenditure hovered around 1% between 2014 and 2021 (Figure 6). Data show that 6% of the total government expenses was dedicated to ongoing health expenses which is below the target of the Abuja agreement set at 15% (African Summit on HIV/AIDS, tuberculosis and other related infectious diseases, 2001). In addition, nutrition accounted for about 30% of RMNHN expenditures (Figure 7).
- Households incur most of the regular healthcare expenditures (Figure 8). On average, they accounted for 56% of all regular healthcare expenditures per year during the studied period.
- The government's contribution to regular healthcare expenditures has virtually remained unchanged from 22% in 2014 to 23% in 2021.
- There are inequalities in ongoing health and nutrition expenditures per capita between regions: Dakar is the region where the 2021 per capita expenditures are the highest (87,429 CFA francs), followed by Ziguinchor (70,446 CFA francs), Kédougou (40,456 CFA francs) and Saint-Louis (34,833 CFA francs). Of the three main funding sources for RMNHN in Senegal, the government provides the lowest amount.

[6] This ministry is responsible for the preparation and implementation of the Senegalese decentralization policy (Ministère de l'aménagement du territoire et des collectivités locales, 2024).

Households cover 46% of the cost on average, while external donors fund 39% on average.

- In 2021, Ziguinchor (14,420 CFA francs) and Dakar (13,814 CFA francs) have the highest per capita spending on SRMN-N in Senegal.
- Kédougou is the region where external donors provide the most funding for RMNHN in Senegal.
- In the period studied, the United States was the main donor (mainly through the Bill & Melinda Gates Foundation), followed by the Global Fund (Figure 8).
- Results of an efficiency analysis reveal that the average efficiency score with regards to how funds were spent was 48% in 2015. This means that, on average, 48% of financial resources were optimized to attain service outcomes, but 52% of resources were either wasted, underused or misallocated. In 2015, three regions came out as being the most efficient namely Dakar, Diourbel and Thiès. Kédougou was the least efficient in RMNHN spending, with a score of 7%. This means that 93% of resources were not optimized in this region.

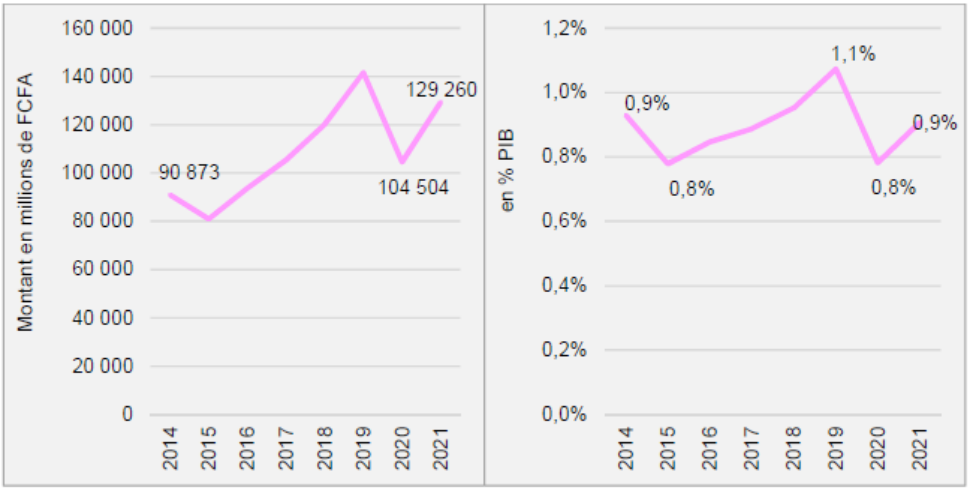


Figure 5. SRMN-N spending (in millions of CFA francs and as a % of GDP) from 2014 to 2021, Sénégal.

2021.

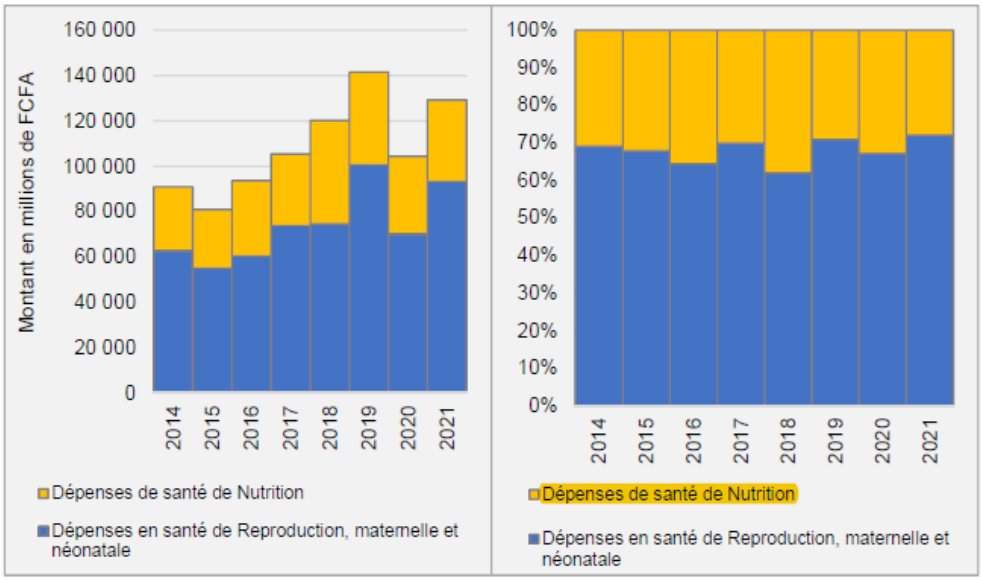


Figure 6. SRMN-N spending by component, 2014-2021, Sénégal

-2021

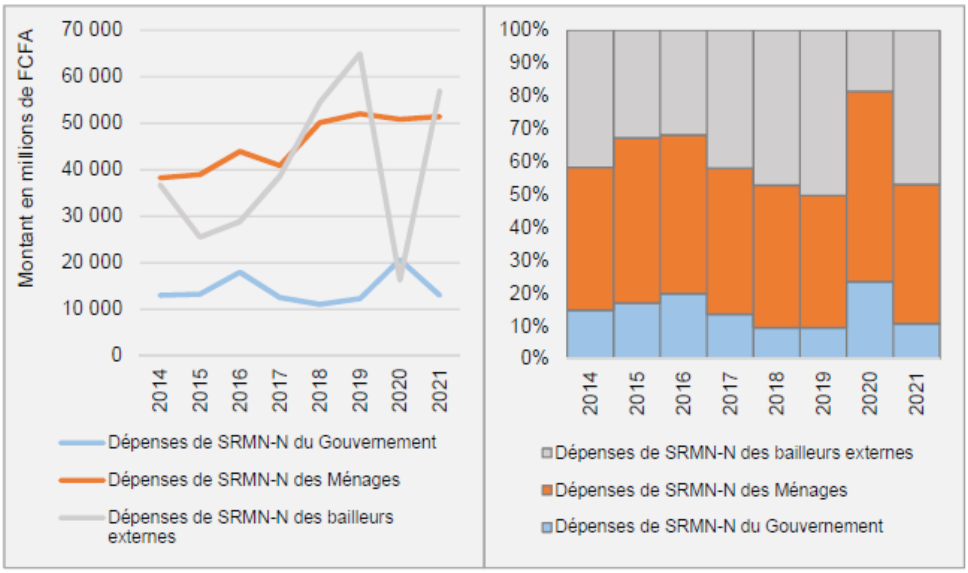


Figure 7. RMNHN expenditure by sources of funding, 2014-2021, Sénégal

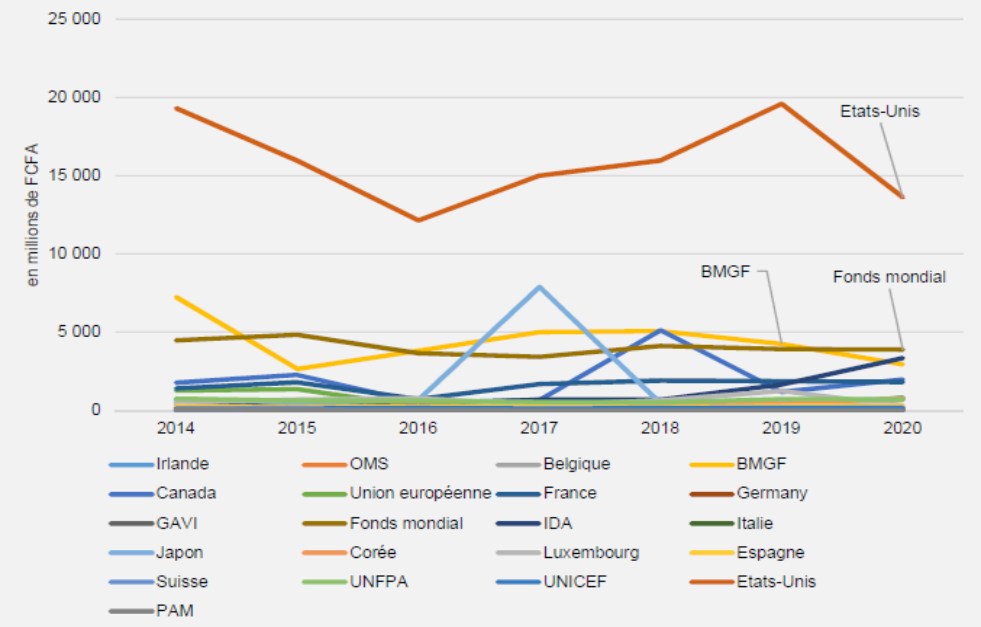


Figure 8. Major donors supporting maternal reproductive health and neonatal programs in Senegal.

CNDN's Nutrition Strengthening Program (NSProg)

Between 2004 and 2015, the GoS contributed between 6% and 62% of the costs of the NSProg (World Bank, 2017).

During the landscape analysis meeting, the information gathered revealed that CNDN's annual budget for 2024 is 7 billion CFA francs. Of this total, 80% is financed by loans from ISMEA (Innovation for Maternal and Child Health in Africa, funded by Canadian organizations) and PIPAEDS (Investing in the early years for human development in Senegal, funded by the World Bank). The GoS contribution, allocated under a specific budget line for nutrition at the Prime

Minister's Office, is 1.2 billion CFA francs, which represents about 20% of the total budget. However, this amount can vary between 1 and 7 billion CFA francs depending on the year. Other partners, including UNICEF, WFP and Nutrition International, also contribute to the CNDN budget.

Integrated strategic plan for reproductive, maternal, newborn, child and adolescent health and nutrition (2024-2028). (MSAS, 2024)

Implementing the plan will require 191 billion CFA francs, including 25 billion for the prevention of acute malnutrition and 2.4 billion for infant and young child feeding. There is no specific budget for improving the dietary practices of PW or on IFA supplementation.

"Capacities of the Nutrition Sector in Senegal." Analysis & Perspective study (Deussom et al., 2018)

Objectives: a) To improve knowledge of the organizational and institutional capacities and constraints of the nutrition sector in Senegal and, b) to identify the capacities needed to improve future functionality, particularly with regard to multi-sectoral coordination.

- The Senegalese government provides nutrition funding through a direct budget line in the national budget. This funding has been increasing since 2001 and it seems that there is an explicit requirement for a nutrition line in local authority budgets although such information was not retrieved in the Act 3 document on decentralization, (Ministère de l'aménagement du territoire et des collectivités locales, 2013).
- Public sector funding for specific nutrition interventions comes from a variety of sources: local authorities (42%), Health and Social Action Ministry (30%), the Prime Minister's Office (19%), research (7%), trade (1%) and the Education Ministry (1%).
- The study highlights a strong dependency on technical and financial partners to fund the CNDN (former CLM) and their regional arms between 2004 and 2015.
- It appears that between 2004 and 2015, the Senegalese government contributed 36% of the CNDN budget while the rest was provided by the World Bank (56%), UNICEF (4%) and NI, GAIN and WFP (2% in total for the 3). Over the years, financial support to the CNDN from external donors has decreased (from around 95% in 2004 to 60% in 2015).

Additional studies

Ruel-Bergeron (2018) and Ofosse (2018) present data from analyses of nutrition commitments between 2012 and 2015. The results show that an annual amount of US$17 million, or US$1.30 per person/year, was dedicated to nutrition during this three-year period (Ruel-Bergeron, 2018). Ofosse's results show that the majority of funds (34%) were allocated to food security interventions, 31% to health-related activities (including deworming of pregnant women and children), 22% to community actions (particularly behaviour change activities) and 4% to the prevention of micronutrient deficiencies. The funds allocated to preventing micronutrient deficiencies were managed mainly by the Health and Social Action Ministry, the Prime Minister's Office (possibly CNDN) and the Trade Ministry.

ANC and PNC costs

According to the data collected during the LA, several technical and financial partners provide funds for maternal health and nutrition at the regional level, including ISMEA, which greatly supports access to ANC through a health mutual scheme/insurance. As a result, PW can get their IFA supplements free of charge or at low cost (75–150 CFA francs per 10 tablets). The same applies to deworming treatments, although it appears that the cost is generally borne by the pregnant women themselves. The scheme covers over 80% of the costs associated with many ANC services.

According to the information gathered, ANC costs are as follows:

Table 9. Cost per unit (CFA francs) of ANC components.

Item	Cost per unit (CFA franc)
Consultation only	200 - 1000 CFA francs With health insurance: 100 CFA francs instead of 300 CFA francs
IFA	50-100 CFA francs/10 tablets (200 mg iron fumarate/sulphate + 0.25 mg folic acid) 500-800 CFA franc for the syrup (125 ml bottle of LeFer syrup, 5 ml = 34 mg of elemental iron)
Dewormer (albendazole, mebendazole)	100-300 CFA francs Free if obtained during advanced strategy with vaccination but also at facility level (e.g. Health post of Kandiaye)
CBC	2000 - 7000 CFA francs Includes Hb test

Despite the benefits of the health insurance regime, PW still incur some costs for ANC, IFA supplementation, consultations and transportation to health facilities. In addition, the long-term sustainability of this health insurance needs further investigation.

As with ANC, the cost of a single postnatal consultation varies between 300–500 CFA francs. If a pregnant woman needs IFA, it will be prescribed, and she will have to buy it.

PILLAR 4 - FINANCING

Summary of Opportunities

- There is a dedicated line for nutrition in the Prime Minister's Office budget. Advocacy efforts could be undertaken to increase the funds allocated to this line for maternal nutrition interventions, to ensure free micronutrient supplementation for PW.

Summary of Challenges

- Nutrition activities in various ministries, including the Health and Social Action Ministry, are embedded in their overall budget. It is therefore difficult to estimate the funds used for specific and sensitive nutrition activities (e.g. IFA supplementation). Moreover, this information is sensitive to obtain.
- Budget allocated to maternal nutrition is insufficient.

Prioritization

Results of the landscape analysis including the list of challenges and opportunities to the IFA-MMS transition were presented on the first day of a workshop held in Dakar on July 23-25, 2024. On days 2 and 3, the analysis of bottlenecks and opportunities including the identification of potential solutions to overcome identified barriers to the IFA-MMS transition as well as the identification and prioritization of questions for implementation research were conducted.

Over 50 representatives from different government institutions (MSAS, NSProg, ARP, CNDN, Regional health teams), technical and financial partners (e.g. UNICEF, Solthis, HKI, Counterpart), academic institutions (UCAD, University of Bambay) and professional associations (e.g. midwives) participated to this event (please see workshop 2 report).

METHODOLOGY

To guide this prioritization exercise, a modified child health and nutrition research initiative (CHNRI) process was used (Rudan et al., 2008).

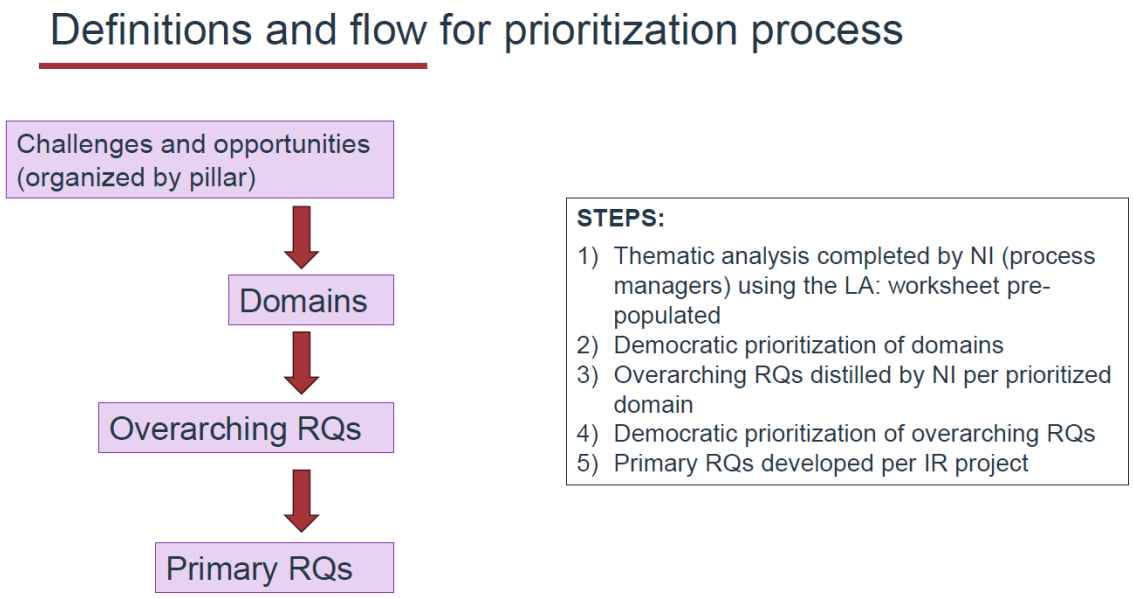


Figure 9. Definitions and flow for prioritization process.

DATA COLLECTION

As mentioned previously, challenges and opportunities related to each pillar which were identified during the LA process were first presented to the entire audience (Figure 9). This step was followed by the classification of every challenge under different domains in pre-populated worksheets which were distributed to members of five (5) different working groups on day 2. The Financing and Policies and Protocols pillars were omitted from this exercise on the basis that key challenges and opportunities identified under these pillars would lend themselves better to recommendations for advocacy and follow up, rather than exploration through an implementation research project. Furthermore, due to the inherent overlap between pillars, some

key challenges and opportunities from the Policies and Protocols and Financing Pillars appear in the prioritization exercise. The team of consultants and the Nutrition International technical staff were assigned to facilitate the exchanges in each group.

Each group was assigned at least one domain in each of the two selected pillars. Each team was asked to a) validate the information included on the worksheets as well as to remove non appropriate/add any missing information, b) identify underlying reasons to each challenge and, c) identify potential solution to the challenge that could be developed and tested through implementation research.

After presentation of the groupwork, two domain prioritization surveys were conducted with workshop participants using Survey Monkey software: one survey represented the Service Delivery pillar, and the other, the Product and Supply pillar.

Surveys were sent by email to workshop participants (n = 34 participants) at the end of day 2. Survey respondents were asked to rank each domain using the following criteria via a five-point Likert scale:

Table 10 – Criteria for Domain and Research Question Prioritization

	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	I cannot answer
Relevant: Addresses an important program implementation challenge for transitioning from IFA to MMS for pregnant women in Senegal.						
Feasible: Conducting this research would be acceptable to key stakeholders in Senegal (including government, healthcare providers, pregnant women, and their families).						
Maximize impact: Applying the results would help maximize the health impact of MMS for pregnant women in Senegal.						
Inform policy and practice: Results would inform policy and practice in Senegal related to						

maternal and neonatal health and nutrition.						
Reduce inequality: Applying the results would help ensure under-served pregnant women in Senegal benefit from MMS.						

DATA ANALYSIS

Responses from each survey were ranked by research domains beneath each of the two pillars. The domain prioritization exercise was essential so that overarching research questions could be developed per prioritized domains overnight between workshop days 2 and 3. More importantly, to better suit the needs and expectations of the Senegal MMS Taskforce, it was essential to organize ranked research questions per ranked domain so that prioritized research themes and respective questions may be delegated to appropriate MMS taskforce representatives. The domains to be ranked were the followings:

Service Delivery:

- Health information system
- Distribution of health personnel
- Capacity of frontline health workers
- Capacity of stock managers (e.g. pharmacists and warehouse attendants)
- Access and availability of ANC
- Quality of antenatal care and coordination

Product and Supply:

- Forecasting
- Importation
- Storage
- Distribution
- Packaging
- Access to and consumption of MMS[7]

Using data from the first two surveys, overarching research questions per potential solution (tied to one key challenge each) in the prioritized domains identified by each working group were developed by the Nutrition International team (or the CHNRI process managers) in the evening of day 2 (Figure 9).

On day three of the workshop, participants went back into groups to review, edit, and add to or remove questions from the overarching research questions list proposed by the process managers. Additional surveys were then administered to rank the overarching research questions. Domains

[7] The global MMS community often organizes issues and opportunities related to MMS into four pillars: Financing, Policies and Protocols, Product and Supply, and Service Delivery. This framework is one way to approach MMS programming, and our team has used it throughout this project. However, it's important to note that there is subjectivity and overlap in categorizing different domains. For example, *access to and consumption of MMS* could arguably be considered its own separate pillar. This caveat applies to other domains and their categorization under these pillars as well (*capacity of stock managers* is another good example – could fit under the Product and Supply pillar).

were merged whose research questions contributed to the same outcome. Participants were again asked to rank research questions using the same criteria introduced above.

RESULTS

Validation of bottlenecks & challenges and, identification of solutions

Please see appendix 2 for the results of the first exercise related to the validation of challenges and opportunities identified during the LA process with regards to the transition from IFA to MMS, including potential solutions, which were used to develop draft research questions by the CHNRI process managers.

Domain prioritization

A total of 26 responses for the Service Delivery and 23 responses for the Product and Supply surveys respectively were received out of a potential of 34. Results of the ranking process, showing responses on each domain part of the two pillars are presented below.

Table 10. Overall rankings for the domains under Service Delivery and Product and Supply pillars.

Domain	Rank
Access and availability of antenatal care	2 (86%)
Access to and consumption of MMS	2 (86%)
Capacity of frontline health workers	5 (84%)
Distribution of health personnel	5 (84%)
Forecasting	5 (84%)
Quality of antenatal care	8 (82%)
Stock distribution	8 (82%)
Health services information and coordination	8 (82%)
Capacity of stock managers	10 (80%)
Packaging	10 (80%)
Storage	11 (78%)
Importation	12 (70%)

Research question prioritization

Using responses from the day 3 survey, multiple research questions were developed and ranked for the following domains:

- Capacity of frontline health workers, stock managers, and quality of antenatal care (n=13)

- Distribution and packaging (n=10)
- Appropriate use and consumption (n=13)
- Distribution of healthcare providers (n=11)

Table 11. Proposed initial research questions and ranking.

Overarching research question	Overall rank
Which are the most effective behaviour change initiatives to promote delivery of and adherence to MMS for pregnant women?	94%
How can the different categories of healthcare providers (nurses and midwives) and community actors interact to optimize access to ANC and MMS adherence?	93%
Which financing mechanism can best facilitate access to MMS for pregnant women?	91%
How can the distribution of providers within a district affect pregnant women's adherence to MMS?	91%
What mechanisms need to be put in place to improve the capacity (knowledge and skills, including counseling) of service providers, including community actors, to deliver quality maternal nutrition services, including MMS supplementation, as part of comprehensive ANC, to increase the uptake of MMS?	90%
Which delivery method(s) would best ensure access to MMS for pregnant women?	88%
How can the community be mobilized to improve pregnant women's adherence to MMS?	88%
How can we improve stock managers' skills and knowledge, including of storage standards to ensure the continued availability of MMS?	87%
What type of packaging best supports pregnant women's adherence to MMS?	80%

The following research questions fell within domains which had just one research question and therefore, did not require ranking.

1. How can we improve provider capabilities to optimize access to MMS through ANC? (under the *access and availability of ANC* domain, which was tied for highest ranked domain at 86%)
2. How can the use of management tools and adherence data be optimized to avoid MMS stock outs? (under the *forecasting* domain, which was ranked at 84%)
3. How can strengthening the health information system help improve adherence to MMS among pregnant women? (under the *health services information system and coordination* domain, which was ranked at 82%)
4. What strategies are needed to ensure that adequate storage conditions are established and maintained for MMS? (under the *storage* domain, which was ranked at 78%)

5. How can a continuous and adequate supply of MMS be effectively ensured? (under the *importation* domain, which was ranked at 70%)

A summary of ranked implementation research domains and questions which can provide guidance around the transition from IFA to MMS in Senegal is presented in the table below.

Table 12. Summary list of ranked implementation research domains and questions for the potential introduction of and transition to MMS in Senegal.

Rank	Domain	Respective RQs
1	Access and availability of ANC	How can we improve provider capabilities to optimize access to MMS through ANC?
2	Access to and consumption of MMS	Which are the most effective behaviour change initiatives to promote delivery of and adherence to MMS for pregnant women?
		Which financing mechanism can best facilitate access to MMS for pregnant women?
		How can the community be mobilized to improve pregnant women's adherence to MMS?
3	Distribution of health personnel	How can the distribution of providers within a district affect pregnant women's adherence to MMS?
		How can the different categories of healthcare providers (nurses and midwives) and community actors interact to optimize access to ANC and MMS adherence?
4	Forecasting and storage	How can we improve stock managers' skills and knowledge, including of storage standards to ensure the continued availability of MMS?
		What strategies are needed to ensure that adequate storage conditions are established and maintained for MMS?
5	Capacity of frontline health workers, stock managers, and quality of antenatal care	What mechanisms need to be put in place to improve the capacity (knowledge and skills, including counseling) of service providers, including community actors, to deliver quality maternal nutrition services, including MMS supplementation, as part of comprehensive ANC, to increase the uptake of MMS?
		How can we improve stock managers' skills and knowledge, including of storage standards to ensure the continued availability of MMS?
6	Stock distribution and packaging	Which delivery method(s) would best ensure access to MMS for pregnant women?
		What type of packaging best supports pregnant women's adherence to MMS?
7	Health services information and coordination	How can strengthening the health information system help improve adherence to MMS among pregnant women?
8	Importation	How can a continuous and adequate supply of MMS be effectively ensured?

RECOMMENDATIONS AND NEXT STEPS

The LA results, respective discussions, and identification of potential solutions to explore through implementation research helped define key recommendations to support a potential transition from IFA to MMS in Senegal, should the government choose to proceed. Many of these recommendations could also apply to the existing IFA program and ANC platform regardless of whether MMS is introduced.

1. **MMS IR should be conducted in Senegal** to test potential solutions to identified barriers to maternal nutrition programming using the ranked domains and questions above. The MMS Taskforce should coordinate and oversee all MMS IR in Senegal including resource mobilization to support these activities. Results from MMS IR can provide critical information to guide the SMART transition and scale of MMS in Senegal.
2. **Policies and protocols:** A clear process should be developed and executed for alignment and updating of content across policies and protocols relating to maternal nutrition and to support the transition to and scale up of MMS. Alignment of content across policies and protocols to achieve harmonization will help to ensure optimal anaemia detection and treatment; and the abbreviation "MMS" should be clarified in the MSNP.
3. **Service delivery:** To take forward the successful transition to and scale up of MMS, ANC providers require additional training and tools to reinforce maternal nutrition and behaviour change techniques, along with appropriate follow-up to ensure skill integration. Distribution of healthcare staff and roles and responsibilities of community health personnel should be revisited.
4. **Supply chain:** Stock outs at the central level and the cascading repercussions were identified as one of the biggest barriers to IFA programming in Senegal and must be resolved. In addition, MMS should be added to the Essential Medicines List.
5. **Financing:** A specific budget line is required to ensure a sustainable supply of MMS at the central level, and domestic resource mobilization for MMS should be explored. MMS should be subsidized for pregnant women.

Wrap-up

LIMITATIONS

The LA process has provided a wealth of information on the IFA program and ANC delivery system in Senegal in a very short period of time. Although not all relevant stakeholders have been met during the field data collection, the data saturation seems to have been reached but still, some key information on the MSAS planning and budgeting on maternal nutrition is lacking.

Moreover, limited time was allocated to the prioritization exercise during the second workshop which normally is a lengthy process to allow sufficient time for reflection and refinement. Yet, the thoroughness and high quality of the LA and our ability to pre-populate sections of the tools have contributed to speed up the process. However, there were also cons to pre-populating the tools, including potential introduction of bias, and that not as many potential solutions were listed as anticipated. This was likely because participants didn't have the time to reflect on the landscape analysis results and were only given a few hours to complete the worksheets. Lack of time for reflection on development of research questions was also a limitation, as this was done late at night between workshop days two and three without sufficient time for refinement.

In addition, the translation of technical documents, including presentations, back and forth from French to English may have led to information losses due to translation. However, the team tried to be extremely cognizant of this and implemented several mitigation strategies. Lastly, there was a limited response rate on the research question prioritization surveys (29-76%).

CONCLUSION

Despite the limitations, we believe that the Senegalese government now has crucial information to make informed decisions on key areas for investigation and where additional support is needed in the transition from IFA to MMS. The newly established MMS Taskforce, supported by Nutrition International and other key partners, could lead the advancement of the MMS agenda in the country by focusing on agreed-upon bottlenecks and opportunities. The next step will be for the MMS Taskforce to validate and finalize the list of ranked research questions and domains as well as recommendations. Thereafter, interested and resourced partners could move forward with acting on recommendations and/or implementation research as assigned by the Taskforce. The protocols of the MMS studies to be undertaken this year by HKI and Solthis could also help the MMS working group to define questions and standards for future implementation research.

References

Agence Nationale de la Statistique et de la Démographie. (2023). Données de population. ANSD. Available from: https://www.ansd.sn/Indicateur/donnees-de-population.

Agence Nationale de la Statistique et de la Démographie (ANSD) [Sénégal], and ICF (2023). Enquête Démographique et de Santé du Sénégal 2023. Rapport des indicateurs-clés. Dakar, Sénégal and Rockville, Maryland, USA: ANSD and ICF.

Agence Nationale de la Statistique et de la Démographie (ANSD) [Senegal], and ICF. (2020). Sénégal: Enquête continue sur la prestation des services de soins de santé (ECPSS) 2019-Tableaux. ANSD : Dakar, Sénégal

Agence Nationale de la Statistique et de la Démographie (ANSD) [Sénégal], and ICF. (2019). Sénégal : Enquête Démographique et de Santé Continue (EDS-Continue 2019). Rockville, Maryland, USA: ANSD and ICF.

Agence Nationale de la Statistique et de la Démographie (ANSD) [Sénégal], and ICF. (2018). Sénégal: Enquête Démographique et de Santé Continue (EDS-Continue 2017). Rockville, Maryland, USA: ANSD and ICF.

Agence Nationale de la Statistique et de la Démographie (ANSD) [Sénégal], and ICF International. (2012). Enquête Démographique et de Santé à Indicateurs Multiples au Sénégal (EDS-MICS) 2010-2011. Calverton, Maryland, USA: ANSD and ICF International.

Agence Sénégalaise de règlementation pharmaceutique. Liste nationale des médicaments et produits essentiels. Available from : : https://arp.sn/liste-des-amms/#

African Summit on HIV/AIDS, tuberculosis and other related infectious diseases. (2001). Abuja declaration on HIV/AIDS, tuberculosis and other related infectious diseases. Abuja, Nigeria. April.

Ba, D. M., Ssentongo, P., Kjerulff, K. H., Na, M., Liu, G., Gao, X., Du, P. (2019). Adherence to iron supplementation in 22 Sub-Saharan African countries and associated factors among pregnant women: A large population-based study. *Current developments in nutrition*, *3*(12), nzz120. https://doi.org/10.1093/cdn/nzz120

Béhanzin, S.O.P.R, Ly, B.S., Mbaye, A., Sarr, K., Diop, N., Dieng, D., Ndiaye, A., Bocoum, F.Y., Diallo, A.I., Thiam, S., Faye, C., Doucouré, A., Diaw, T.G., Faye, A., Martinez Alvarez M. (2023). Étude du financement de la santé reproductive, maternelle, néonatale et de nutrition au Sénégal sur la période 2014-2021. Dakar, Sénégal. Juillet

Comité Sénégalais pour la fortification des aliments en micronutriments. (2018). Senegal: National nutrition survey. Survey report on the evaluation of food fortification on the nutritional status of children aged 6-59 months and women of childbearing age: detailed analysis of the 2018 nutrition survey and comparative analysis with the 2010 nutrition survey. Version of June, 22 2022.

Conseil national de développement de la nutrition (CNDN). (2024). Plan stratégique multisectoriel de nutrition, 2024-2028. CNDN : Dakar, Sénégal.

Conseil national de développement de la nutrition (CNDN). (2024). Programme de renforcement de la nutrition (PRN). Available from : https://cndn.sn/comment-intervenons-nous/projets-et-programmes/programme-de-renforcement-de-la-nutrition-prn/

Conseil national de développement de la nutrition (CNDN). (2024). Programme de renforcement de la fortification. Available from`: https://cndn.sn/comment-intervenons-nous/projets-et-programmes/programme-de-renforcement-de-la-fortification-prf/

Deussom N., G., Wise V., Ndione, M.-S., Gadiaga, A. (2018). Capacities of the nutrition sector in Senegal." Analysis & perspective: 15 years of experience in the development of nutrition policy in Senegal. World Bank, Washington, DC; CLM, Dakar, Senegal.

École nationale de développement sanitaire. Training programs of midwives and nurses. Available from : http://endss.free.fr/formations/section%20sage%20femme.pdf (midwives) and http://endss.free.fr/formations/sectionInfirmier.pdf (nurses)

Genève International. (2024). Sénégal: Programme de fortification des aliments à large échelle. Available from : https://www.geneve-int.ch/fr/senegal-programme-de-fortification-des-aliments-large-echelle

Institut de Formation en Administration des Affaires du Sénégal. Training program in dietetics. Available from : https://ifaa.sn/cours/bts-dietetique/

ISMEA project website. Available from: https://www.faapa.info/blog/ismea-un-projet-visant-a-corriger-les-disparites-en-matiere-de-sante-reproductive/

Kande, N.M.A. (2021). Motivation et maintien du personnel de santé dans un contexte de rareté des ressources humaines : cas des zones périphériques du Sénégal. In : Serge Francis Simen. *Management des organisations africaines, diversité et développement des territoires. Mélanges en l'honneur du Professeur Bassirou Tidjani.* Caen, EMS Ed., « Questions de société », p. 271-295. DOI : 10.3917/ems.simen.2021.01.0271. Available at : https://www.cairn.info/management-des-organisations-africaines-diversite---9782376874478-page-271.htm

Karyadi, E., Reddy, J. C., Dearden, K. A., Purwanti, T., Mardewi, Asri, E., Roquero, L. B., Juguan, J. A., Sapitula-Evidente, A., Anand, B., Warvadekar, K., Bhardwaj, A., Alam, M. K., Das, S., Nair, G. K., Srivastava, A., Raut, M. K. (2023). Antenatal care is associated with adherence to iron supplementation among pregnant women in selected low-middle-income-countries of Asia, Africa, and Latin America & the Caribbean regions: Insights from Demographic and Health Surveys. *Maternal & Child Nutrition*, *19*(2), e13477. https://doi.org/10.1111/mcn.13477

Keats EC, Haider BA, Tam E, Bhutta ZA. Multiple-micronutrient supplementation for women during pregnancy. Cochrane Database Syst Rev. 2019 Mar 14;3:CD004905

Ministère de l'aménagement du territoire et des collectivités locales. (2024). Available from: https://collectivitesterritoriales.sn/le-ministere/#:~:text=Le%20Minist%C3%A8re%20des%20collectivit%C3%A9s%20territoriales%2C%20du%20d%C3%A9veloppement%20et%20de%20l,que%20de%20la%20mise%20en

Ministère de l'aménagement, du territoire et des collectivités locales. (2013). Acte III de la décentralisation – Propositions pour la formulation d'une cohérence territoriale rénovée. Comité de pilotage de la réforme de la décentralisation du Sénégal

Ministère du commerce et des PME. Procédures Import-Export. Available from : https://senegalcommerce.sec.gouv.sn/ProceduresImportDetails.aspx#:~:text=ORBUS%20is%20a%20r%C3%A9network%20for%20computers,op%C3%A9ration%20for%2import%2export.&text=%2DCertificate%20of%20origin%20and%20of,export%20and%20various%20other%20certificates

Ministère de la santé et de l'action sociale. (2024). Plan stratégique intégré de la santé de la reproduction, de la mère, du nouveau-né, de l'enfant, de l'adolescent et la nutrition (PSI SRMINIA_N)-2024-2028. Direction de la santé de la mère et de l'enfant, MSAS : Dakar, Sénégal. Février.

Ministère de la santé et de l'action sociale. (2020). Rapport annuel de suivi de la carte sanitaire – 2019. Cellule de la carte sanitaire et sociale, de la santé digitale et de l'observatoire de la santé, Dakar, Sénégal.

Ministère de la santé et de l'action sociale. (2019). Plan national de développement sanitaire et social (PNDSS), 2019-2028. MSAS : Dakar, Sénégal.

Ministère de la santé et de l'action sociale. (2018a). Politiques normes et protocoles des services de santé de la reproduction et survie de l'enfant: Santé maternelle, périnatal et néonatal. Direction de la santé de la mère et de l'enfant. MSAS : Dakar, Sénégal.

Ministère de la santé et de l'action sociale. (2018b). Politiques normes et protocoles des services de santé de la reproduction et survie de l'enfant: Alimentation et nutrition. Direction de la santé de la mère et de l'enfant. MSAS : Dakar, Sénégal.

Ministère de la santé et de l'action sociale. (2018c). Politiques normes et protocoles des services de santé de la reproduction et survie de l'enfant : Éléments généraux. Direction de la santé de la mère et de l'enfant. MSAS : Dakar, Sénégal.

Ministère de la santé et de l'action sociale. 2015. Document de politique nationale sur la nutrition, 2015-2025. MSAS : Dakar, Sénégal. November.

Ministère de la santé et de l'action sociale. (2014). Politique nationale de santé communautaire. Direction générale de la santé-cellule de santé communautaire, MSAS : Dakar, Sénégal. December.

Ministère de la santé et de l'action sociale. (2013). Politique nationale pour l'alimentation du nourrisson et du jeune enfant. Division de l'alimentation et de la nutrition, MSAS : Dakar, Sénégal. December.

Ministère de la santé et de l'action sociale. (2007). Plan stratégique national pour la survie de l'enfant. MSAS : Dakar, Sénégal. July.

Ministère de la santé et de l'action sociale. (Unknown year). Manuel de formation des prestataires de santé sur l'alimentation de la mère, de l'alimentation du nourrisson et du jeune enfant (AM-ANJE). Direction de la santé de la mère et de l'enfant, MSAS: Dakar, Sénégal.

Ministère de la santé et de la prévention médicale. (2006). Politique nationale pharmaceutique. Direction de la pharmacie et des laboratoires, MSPM: Dakar, Sénégal. August.

Ndiaye, N. F., Idohou-Dossou, N., Diouf, A., Guiro, A. T., Wade, S. (2018). Folate deficiency and anemia among women of reproductive age (15-49 years) in Senegal: Results of a national cross-sectional survey. *Food and Nutrition Bulletin*, *39*(1), 65–74.

Ndiaye, S., Ayad, M. (2006). Enquête Démographique et de Santé du Sénégal 2005. Centre de Recherche pour le Développement Humain [Sénégal] and ORC Macro : Calverton, Maryland, USA.

Ningue, B.A., Galibois, Blaney, S. (2021). Nutrition services by health providers during antenatal consultations in Senegal (Kolda region): A comparison of observed versus self-reported practices. *Journal of Global Health Reports*: e2021035

Ningue B.A., Galibois, I. Blaney, S. (2020). Antenatal nutrition services offer in primary health care facilities of Kolda region, Senegal. *Journal of Global Health Reports*: e2020103

Offosse N.M.-J. (2018). Nutrition financing in Senegal - Analysis & Perspective: 15 years of experience in the development of nutrition policy in Senegal. World Bank, Washington, DC; CLM, Dakar, Senegal.

Rudan, I., Gibson, J. L., Ameratunga, S., El Arifeen, S., Bhutta, Z. A., Black, M., Black, R. E., Brown, K. H., Campbell, H., Carneiro, I., Chan, K. Y., Chandramohan, D., Chopra, M., Cousens, S., Darmstadt, G. L., Gardner, J. M., Hess, S. Y., Hyder, A. A., Kapiriri, L., … Webster, J. (2008). Setting priorities in global child health research investments: Guidelines for implementation of CHNRI method. *Croatian Medical Journal, 49*(6), 720–733. https://doi.org/10.3325/cmj.2008.49.720

Ruel-Bergeron, J. (2018). The case for investment in nutrition in Senegal - Analysis & perspective: 15 years of experience in the development of nutrition policy in Senegal. World Bank, Washington, DC; CLM, Dakar, Senegal.

Shaping Equitable Market Access for Reproductive Health project (SEMA). (2023). Summary of the evaluation and recommendations of SEMA Senegal. Dakar, Senegal. October.

Siekmans, K., Roche, M., Kung'u, J. K., Desrochers, R. E., De-Regil, L. M. (2018). Barriers and enablers for iron folic acid (IFA) supplementation in pregnant women. *Maternal & Child Nutrition*, *14 Suppl 5*, e12532. https://doi.org/10.1111/mcn.12532

Smith ER, Shankar AH, Wu LS-F, Aboud S, Adu-Afarwuah S, Ali H, et al. Modifiers of the effect of maternal multiple micronutrient supplementation on stillbirth, birth outcomes, and infant mortality: a meta-analysis of individual patient data from 17 randomised trials in low-income and middle-income countries. Lancet Glob Health. 2017 Nov;5(11):e1090–100.

Université Cheikh Anta Diop de Dakar. Graduate programs in nutrition. Available from : https://larnah.ucad.sn/wp-content/uploads/2020/02/Prospectus-Master-NAH-actualise%CC%81.pdf

Université Cheikh Anta Diop & Moncton Universities. (2015). Results of the PAG workshop in Senegal on the participatory evaluation of the intervention on quality IFA supplementation during pregnancy. UCAD: Dakar, Senegal; UdeM: Moncton, NB, Canada.

Université du Siné Saloum El-Hadj Ibrahima Niass. Programmes de formation en nutrition. Available from : https://www.ussein.sn/ufr-nutrition-et-alimentation/

Verney, A., Reed, B. A., Lumumba, J. B., Kung'u, J. K. (2018). Factors associated with socio-demographic characteristics and antenatal care and iron supplement use in Ethiopia, Kenya, and Senegal. *Maternal & Child Nutrition*, *14 Suppl 1*, e12565. https://doi.org/10.1111/mcn.12565

WHO. (2020). WHO antenatal care recommendations for a positive pregnancy experience: Nutritional interventions update: Multiple micronutrient supplements during pregnancy. Geneva: World Health Organization; License: CC BY-NC-SA3.0IGO.

WHO. (2019). Essential nutrition actions: mainstreaming nutrition through the life-course. WHO: Geneva, Switzerland.

WHO. (2017). Guideline: Preventive chemotherapy to control soil-transmitted helminth infections in at-risk population groups. World Health Organization: Geneva, Switzerland.

WHO. (2016a). Guideline: Daily iron supplementation in adult women and adolescent girls. Available from : http://apps.who.int/iris/bitstream/10665/204761/1/9789241510196_eng.pdf?ua=1&ua=1

WHO. (2016b). Recommendations on antenatal care for a positive pregnancy experience. Available from: https://apps.who.int/iris/bitstream/handle/10665/250796/9789241549912-eng.pdf?sequence=1

WHO. (2012). Global analysis of countries' readiness to accelerate action on nutrition - Country assessment tools. WHO: Geneva, Switzerland.

World Bank. (2017). Project performance assessment report: A decade of World Bank support to Senegal's nutrition program. World Bank: Washington, DC.

Appendices

APPENDIX 1. MAPPING OF INTERNATIONAL AND GOVERNMENTAL PARTNERS AND ASSOCIATIONS INVOLVED IN MATERNAL NUTRITION IN SENEGAL.

Name	Role in maternal nutrition (summary)	Involvement details
UNICEF	Capacity building of ANC providers to promote behavioural change	Project name: Reinforcing Maternal Nutrition Funding Sources: Global Affairs Canada, MUSKOKA Duration: 2 years (2024-2025) Coverage: At least 80% of midwives and head nurses Details: 6. Support to the development of the breastfeeding and newborn and infant nutrition strategy (100 million CFA francs) 7. Support for the development of training materials (five days) on maternal nutrition and design of BCI tools 8. National training of trainers' program (team made up of TFPs, MSAS staff) followed by regional (2.3 million CFA francs per region) and district (2.4 million CFA francs per district) management team trainings (nutrition, reproductive health & health promotion focal points) 9. Regional and district management teams train ANC providers (midwives and head nurses) 10. Training integrated into the MSAS e-learning system 11. Collaboration with HKI, Action Against Hunger
HKI	Five actions to save lives (program with specific actions to save lives): maternal nutrition including MMS, support for early breastfeeding and supplementary feeding, vitamin A	Project name: MMS implementation research Funding Source: Church of the Saints Duration: 1 year (2024-2025), starting July-August 2024

	supplementation, detection and management of acute malnutrition, etc.	Coverage: 20,000-30,000 PW in one of the following regions: Louga, Diourbel or St-Louis Details: 12. Implementation research to assess the services offered and the integration of MMS into the ANC care package, complemented with communication support for MMS. 13. Not clear if HKI will procure MMS from a donation or purchase for research purposes. Project Name: Capacity building on maternal nutrition behaviour change. Partners with UNICEF for training in St-Louis, Matam, Louga, Tamba and Diourbel regions. Complements UNICEF work.
Counterpart	The program aims to improve adolescent schoolgirls and PWs' nutrition.	Project name: Better nutrition for PW through behavioural change strengthening for ANC providers. Funding Source: USAID (21 million CFA francs) Duration: 5 years (2023-2028) Coverage: 25% of PW living in Sédhiou (two districts) and Kolda (three districts) regions by 2026 Details: 14. Partners: World Vision, Imagine 15. Similar training to UNICEF's 16. Achievements: 200 trained "relais communautaire[8]" to date. It is expected that each relais will be responsible/follow for 10 PW. 17. Each "relais" is paid to make home visits to monitor PW's nutrition and ensure that they attend ANCs (500 CFA francs given to each "relais" per visit). Other: Counterpart's initiative to introduce MMS to PW in St-Louis was halted. However, the group believes the region is able to implement MMS systematically. The St-Louis region has a relationship with Vitamin Angels. In

[8] In Senegal, the "relais communautaire" is a community volunteer responsible for information, education and communication activities on behaviour changes (MSAS, 2014. Politique nationale de santé communautaire. Direction générale de la santé-cellule de santé communautaire).

		the future, Counterpart recommends reducing MMS to 60 tablets per bottle because midwives want PW to attend ANC.
Solthis	Capacity building for ANC service providers and institutions (training, supply of equipment and inputs) Support the government's transition from IFA to MMS	Project name: Supporting the transition from IFA to MMS supplementation Funding Source: Bill & Melinda Gates Foundation Duration: 1 year, study starts in 2 weeks Coverage: 13 health facilities, Thiès region Details: • Have trained health providers for this study and defined monitoring indicators (e.g. nutrition counselling, deworming, supplementation). • Will use the data collected in the logs to monitor study indicators. • Obtained an MMS donation (from Counterpart) for this study. • MMS will be provided to PW free of charge during their study.
ISMEA	Support to the Senegalese government to the offer of reproductive health care	Project name: Initiative on the Innovation for the health of mothers and child of Africa Funding source: World Bank loan (70 milliards CFA francs[9]) Duration: 5 years (2019-2024) Coverage: Kaffrine, Kolda, Ziguinchor, Kédougou, Sédhiou, Tambacounda regions. Details: 18. Support in staff provision: 400 midwives, 395 nurses, around 20 medical doctors and 20 pharmacists : estimated cost for the staff at 400 000 000 CFA francs per year 19. Support in equipment and material such as 250 motorcycles for health posts, office furniture, Plumpy Nut, F75, Vitamin A capsules, mebendazole). Provision of electricity to 40 health posts with solar energy. No provision of IFA 20. Support in staff training (e.g. ultrasound technique)

[9] https://www.faapa.info/blog/ismea-un-projet-visant-a-corriger-les-disparites-en-matiere-de-sante-reproductive/

		21. Support to the implementation of a health insurance scheme for PW (equivalent of 1700 CFA francs per woman). In the future, this health insurance is supposed to be integrated to the universal health coverage program. Up to now, around 52 000 PW are covered by this scheme in the six regions. 22. Support covers the entire population of each targeted district 23. Before the implementation of the project, a participatory workshop was held with relevant stakeholders to identify needs for support. 24. Sustainability of the initiative: An agreement has been signed between the GoS and the World Bank which stipulate that the staff recruited by ISMEA will be integrated to the public servants pool when the project will end. This staff will however be maintained in the same structures (where they are actually working) for a period of two years after the completion of the project. As a sign of willingness to respect the government engagement, the governor of the Kolda region has pledged to maintain the staff recruited by ISMEA in his region at the end of the project.
Senegalese Midwives' Association	Optimize midwives' skills to ensure quality ANC service delivery.	Despite a decree passed in 2017 for the association to become a professional order, it has yet to become reality. Membership to the association is voluntary. Midwives need ongoing training, which is not always provided. Refresher training is not compulsory. The Health and Social Action Ministry has done little hiring in recent years. ISMEA has hired many midwives on fixed-term contracts but there is no guarantee they will be integrated in the public service at the end of the ISMEA project. Need to map midwife distribution according to seniority level. Midwives' salaries vary between 50,000 and 150,000 CFA francs monthly.
Pharmaceutical Regulatory Agency (ARP)	To ensure pharmaceutical product quality	Objective: To ensure the quality of pharmaceutical products entering the public and private streams. The agency oversees medicine quality throughout the chain (from purchase to consumption), whether it is manufactured locally or imported.

		It grants market authorization for drugs, in close collaboration with customs for all medicines, and carries out inspections. The agency also sets product price. The DSME must make a formal request to introduce a product for research purposes. It must clearly state the need for the product and submit a pilot project. The process takes approximately 90 days.
CNDN – project #1	Implementation of MSNP	Project name: Nutrition strengthening program (NSProg) General objectives: 25. To improve nutritional status of the population particularly the growth of children below 2 years of age living in poor urban and rural areas. 26. To strengthen institutional and organizational capacities in nutrition. Funding sources: Senegalese State, World Bank, WFP, UNICEF, Nutrition International Duration: 2002-2024 Coverage: 287 289 pregnant and breastfeeding women (90% of the target), adolescent girls and mothers/caregivers of children living in 66 districts spread out in all regions of the country except for the Dakar region. Details: 27. Project focus on communication for behavior change, social mobilization with the involvement/support of « relais communautaires » and community health agents. 28. Indicator: # of talk organized with targeted groups. Data collection monthly.
CNDN – project #2	Idem	Project name: Invest in maternal, child and adolescent health (ISMEA supported) – component on maternal care General objective:

		29. Stimulate the demand for maternal health services by supporting poor households to overcome barriers to the access to health care. Funding source: World Bank (1,8 billion CFA francs) Duration: 2021-2024 Coverage: 35 134 pregnant and breastfeeding women (78% of the total target estimated at 45 000) spread out in 25 districts of Sédhiou, Kédougou, Ziguinchor, Kolda, Tambacounda and Kaffrine regions. Details: 30. Project focus on communication activities (led by community stakeholders) and the provision of financial allocation to women based on conditions. 31. Identification of women by local supporting structure. 32. Follow up of PW by the community health agent. 33. Financial incentive provided to women through a money transfer.
National Supply Pharmacy (NSP)	Ensure supply in medicines including IFA to public and private streams	Objective: Ensuring that 100% of IFA country needs are fulfilled. Details: 34. With regards to IFA tablets, the NSP deals with several suppliers but mostly with India and a local pharmaceutical company (Medis). The NSP asks to each supplier to provide a sample of their product along with their tender 35. UNIMAP is not part of the list of essential medicines in Senegal 36. NSP orders IFA based on annual estimates from regions. 37. Delays to obtain IFA are due to the following: a) custom clearance at the port, b) choice of transportation route (Suez Canal *vs* sea portion in South of the Africa continent), 3) quantity requested not always available, 4) limited funding allocated at the central level to IFA purchase. 38. Delay in delivery: 2-3 months by boat, 15-20 days by air

		39. Coordination with the ARP in charge of the quality control and of the authorization to market medicines. 40. IFA is usually procured is either under syrup, tablets or injectable forms. 41. The selection of IFA product is based on the essential list of medicines and program needs. 42. The « Jeguesinaa » distribution scheme add 15% to the basic cost so as to cover delivery fees to the Regional Supply Pharmacy (RSP). The distribution from the RSP to districts is conducted according to a pre-established plan. 43. NSP supervises storage sites where medicines are kept. There are eight (8) criteria to fulfill to ensure proper storage conditions of medicines including IFA.

APPENDIX 2A. POTENTIAL MMS PROGRAM IMPLEMENTATION CHALLENGES AND OPPORTUNITIES AN SOLUTIONS TO OVERCOME CHALLENGES: SERVICE DELIVERY PILLAR

Domain	Challenges		Opportunities	
Capacities of frontline health workers	1. Anticipated **MMS program implementation challenge** or gap that needs attention:	2. Why? **Underlying reason(s)** for the challenge:	3. Any related **facilitating or enabling factors** that could potentially be built upon to address the challenge, considering the underlying reason:	4. **Potential solutions** to the challenge (implementation strategies) that could be developed and tested through implementation research:
	Health providers (e.g. midwives) not well trained on maternal nutrition (including counseling and nutrition education, MMS supplementation) There is no regular monitoring system implemented by health providers to ensure PW adherence to MMS	(i) Training curricula on nutrition does not cover maternal nutrition (ii) In-service training on maternal nutrition is limited (iii) Limited supervision on maternal nutrition (including MMS supplementation) (iv) Regional and district focal points on food and nutrition with limited capacities in maternal nutrition (v) Number of nutritionists working in the health system is low (vi) Budget allocated to maternal nutrition non clearly identified in overall health budget	(vii) The training curricula of midwives is complete and rigorous with regards to maternal health but must be strengthened on maternal nutrition (viii) Available recommendations on in-services training (ix) Potential for the midwife's association to become an order which could ensure quality in-service training of their members (x) Available recommendations on supervision of health providers (xi) Decentralized supervision conducted on a quarterly basis (xii) MSNP has a component on nutrition	To integrate a module on maternal nutrition in the training curricula of midwives In-service training of regional and district nutrition focal points

			training which could be used for advocacy (xiii) Nutrition training programs (Master and doctorate) available in a few universities (e.g. UCAD, Bambey) (viii) Existence of a specific line for nutrition in the prime minister budget dedicated to the implementation of the MSNP (IX) Some partners dedicate funds to maternal nutrition	
Capacities of stock managers	Training curricula of warehouse attendants not standardized		(i)Availability of pharmacists in each region and district who are supervising warehouse attendants (ii)Rigorous supply mechanism (teamwork between the head of the health facility, a member of the community and the warehouse attendant)	Provision of training on storage conditions and stock management to warehouse attendants

Distribution of health personnel	Unequal distribution of midwives from one region/district to another	(i) Limited motivation of staff to work in remote/difficult areas (ii) Limited number of staff (iii) Security issues is some remote areas (iv) Success rate at the admission to the midwife profession low which limited the available number of midwives (v) Short-term contracts with organizations (vi) Limited recruitment by the government (vii) Absence of a country level mapping on midwives' distribution based on their experience which limits their mobility and motivation (viii) Low salary for some midwives (e.g. 50 000 FCFA/month)	(i) Support from the ISMEA project to ensure the availability of health staff capable to provide ANC in 5 regions, in particular the "duo" midwife-nurse in each health facility (ii) Existence of the midwife's association which can help at reviewing the staff distribution	(i) Define a policy on staff turn-over (ii) Development of a policy to motivate health staff (iii) Maintenance of health staff status in their working area (iv) Commitment of the government to integrate health staff in public services

Quality of services	Application of policies, norms and protocols not optimal (and discrepancies between contents) Availability of quality product (e.g. IFA) MSAS`s recommendation to increase the number of ANC consultations from 4 to 8	(i) Limited health staff availability (ii) High workload of health providers (iii) Ownership of policies, norms and protocols documentation (iv) Limited supply (v) Inadequate stock management (vi) Inadequate storage conditions (vii) Loss track of PW (viii) ANC monitoring tools not updated (e.g. register)	(i) Standard operating procedures readily available and summarized for nurses and midwives (ii) Full implementation of « Jegesinaa » and « Yeksinaa » schemes to come (iii) Sensitization of PW to attend all ANC consultations	(i) Ongoing supervision of health providers (ii)Appropriate management of stock supply (ii) Advocacy to get updated ANC monitoring tools (iii) Harmonization of contents in Policies, Norms and Protocols documents

Access and availability of ANC	Availability and access to ANC consultation limited (and, consequently to IFA supplementation)	(i) Distance to health structures offering ANC consultations might be significant (including the transportation cost) (ii) Number of health structures offering ANC consultations not sufficient (iii) Unequal distribution of health structures offering ANC consultations (iv) Unequal distribution of midwives throughout the country	(i) Outreach strategy carried out monthly by midwives in health hut to offer ANC (ii) ANC offer during public market days (iii) Provision of ANC consultation every day of the week in the majority of health facilities (iv) Availability of the duo midwife-nurse in the majority of health structures (v) Pharmacies and warehouses for IFA procurements closed to health facilities which facilitate IFA purchase (vi) Availability of regional data on the distribution of midwives (vii) Support from the ISMEA project to ensure the availability of the duo midwife-nurse in health facilities of 5 regions and potential for integration of these health providers to the public services	(i) Increase the number of health facilities (ii) Maintenance of midwives and nurses in health facilities by providing some incentives (iii) Harmonization of ANC training to health providers (iv) Provision of ANC consultation during public market days (v) To provide funds to support midwives' studies (vi) To ensure the availability of the duo midwife-nurse in every health structure (vii) To increase the recruitment of midwives and nurses. As such local communities could also help to the recruitment (viii) To integrate ISMEA staff to the public services (ix) To develop and implement a policy on health staff mobility
Health information system and coordination	Challenge to monitor the quality of ANC with regards to nutrition counseling & education, IFA supplementation and deworming Limited coordination between stakeholders	(i) Existence of an indicator on the provision of nutrition advice but it is embedded into a larger indicator which includes family planning (ii) Indicator on nutrition advice & family planning relates to women aged 25-49 years old only	(i) Existence of the DHIS2 software to monitor monthly PW ANC activities which includes the following indicators: # of PW who have completed 4 ANC consultations, # of anaemic PW, # of women to whom IFA has been prescribed	(i) To conduct routine assessment of the quality of ANC data to check their validity, reliability, integrity and precision (ii) To strengthen midwives' capacities on maternal nutrition advice

	involved in maternal nutrition	thus, it does not include all women in reproductive age (15-49 years old) (iii) In the health information monitoring system (DHIS2), there is no indicator on IFA coverage. Actual indicator relates to the number of PW to whom IFA was prescribed (iv) Similarly, in the DHIS2, there is no indicator on deworming for PW (v) Health staff strike is a constraint to the access to ANC data (vi) Insufficient training of midwives on nutrition counseling (vii) Insufficient supervision to ensure data quality reporting in health structures (viii) Absence of a functional coordination mechanism at central level	(ii) Integration of an indicator in the 2023 ANC register on maternal nutrition advice (iii) Availability of monthly and quarterly reports which include ANC data within health facilities (iv) Existence of working groups on maternal nutrition (anaemia and MMS task forces) (v) Regular meetings held between divisions of the MSAS, CNDN (vi) Close collaboration between the ARP and NSP to ensure the provision of quality IFA (vii) The existence of the MSNP which includes sectoral plans and budget (viii) Potential of the OneUN initiative to improve coordination between UN agencies	(iii) To create a unique coordination framework/mechanism at central level

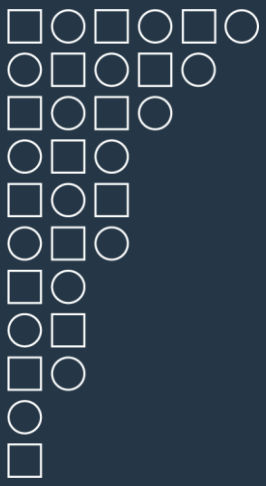
APPENDIX 2B. POTENTIAL MMS PROGRAM IMPLEMENTATION CHALLENGES AND OPPORTUNITIES AND SOLUTIONS TO OVERCOME CHALLENGES: PRODUCT AND SUPPLY PILLAR.

Domain	Challenges		Opportunities	
IFA/MMS Importation	1. Anticipated **MMS program implementation challenge** or gap that needs attention:	2. Why? **Underlying reason(s)** for the challenge:	3. Any related **facilitating or enabling factors** that could potentially be built upon to address the challenge, considering the underlying reason:	4. **Potential solutions** to the challenge (implementation strategies) that could be developed and tested through implementation research:
	Folic acid content in current IFA tablets not in line with WHO recommendations for PW MMS is not part of the list of essential medicines MMS packaging (bottle) may be an issue	(i) Selection of the types of IFA currently ordered by the NSP to be investigated (ii) Available IFA (with appropriate quantity of folic acid) on international markets might be too expensive or difficult to acquire (iii) Bottles are fragile and take much more space: this may be a limitation to quantity to be imported (? and distributed)	(i) Folic acid is part of the essential medicines list and can be ordered separately (ii)MMS will need to be granted a market authorization (i) There is a political willingness to replace IFA by MMS (ii) The composition of MMS is a plus as it contains several micronutrients (iii) Adequate quality control mechanisms are in place by customs	(i) To establish the status of MMS (ii) Make a request to grant a market authorization for MMS (iii) Make a request to integrate MMS in the list of essential medicines (in 2024?) (iv) Identify appropriate packaging for MMS

Forecasting	There is a need-to-know technical specifications for MMS, and then, make a request to procure MMS through DSME MMS not included in the list of essential medicines Estimation of MMS quantity is unknown (but could be based on a hypothesis from IFA consumption) Stock out of IFA at regional, district and health structures levels	44. (i) It is essential to get a market authorization for MMS (i) MMS need to be on the list of essential medicines before being distributed to PW (ii) Non availability of estimates of MMS consumption (iii) Delay in delivery by suppliers (iv) Stock management tools not always used to defined needs (v) IFA (and potentially MMS) needs not met despite regular order for procurement (vi) Lack of complete and reliable data on IFA (and MMS) consumption (vii) Delay in payments of IFA orders (viii) Limited capacities to forecast IFA (and MMS) quantities (ix) Budget for MMS procurement insufficient: IFA tablets are purchased with NSP own funds (x) IFA supply covers the needs of the entire population (not only PW)	(i) To confirm the MMS status: Will it be an essential medicine? Will it be integrated into the NSP distribution channel? (ii) "Jegesinaa" and "Yeksinaa" mechanisms could ensure a regular and stable MMS supply to health facilities (iii) Availability of plans from RSP, districts and health structures on IFA (MMS) need assessment (iv) Exchanges between health facilities to ensure a stable IFA procurements (v) Collaboration between ARP and NSP to ensure the procurement of adequate quality of IFA and, at a reasonable price. (vi) Potential to procure micronutrients locally (e.g. IFA) (vii) Contribution of T&F partners to IFA (and maybe MMS) procurement to be investigated (viii) In-service training provided on a regular basis to health providers	(i) Confirmation of MMS status (ii) Set up a specific budget line at central level to secure MMS purchase (iii) To anticipate needs and use IFA consumption data for MMS procurement (iv) Conduct workshops to strengthen forecasting capacities (v) To provide MMS free of charge (vi) Sensitization on MMS of health providers, pharmacists and warehouse attendants on MMS through supervision, coaching and training

Storage	Storage conditions not always optimal	(i) Storage room for supplies not always adapted/meeting standards (old, absence of air conditioner, of sufficient light, aeration, inadequate temperature, size) (ii) Absence of a space dedicated to supplies storage in some health facilities (iii) Lack of training/refresher training of warehouse attendants	(i) Availability of guidelines on stock management (ii) Availability of a stock follow up form used by pharmacists and warehouse attendants (iii) Availability of the ErpX3 software for stock management and procurement (iv) Availability of trained staff at regional and district level on stock management (v) Availability of staff with experience in health structure warehouse	(i) Need assessment of spaces/rooms to be built, rehabilitated to meet storage standards (ii) Implementation of ongoing training on stock management (iii) Regular supervision (at a predetermined frequency) to follow up stock procurement and management
Distribution and packaging	"Yeksinaa" mechanism not yet implemented Packaging of bottles of 180 tablets of MMS may be an issue (PW housing conditions may be hot, presence of children) Promotion of MMS to be conducted to ensure that PW who will receive a bottle of 180 tablets, will come back for ANC consultation Accessibility to health facilities by PW not always optimal Stock management not optimal too	(i) Transportation used for medicine procurement may not facilitate MMS procurement (e.g. motorcycle) (ii) Hygiene conditions may be problematic if bottles of 180 tablets of MMS are provided to PW (iii) It is possible that PW share MMs with others. Safety and storage of MMS (if bottle of 180 tablets is provided) may be problematic (iv) The provision of a bottle of 180 tablets may limit subsequent visits of PW to health structures and thus, decrease ANC coverage (v) Distance of the health facility in some may limit the access to MMS	(i) Potential for "Yeksinaa" mechanism to ensure a regular supply to health centers and posts despite the cost for the logistics (ii) Bottles of 180 tablets of MMS can be provided during ANC consultations (iii) Strengthen capacities of health providers on MMS (iv) Use of the ErpX3 software for MMS procurement	(i) Potential for the procurement of bottles of 30 tablets using a government`s subsidy (ii) Distribution of bottles of 30 tablets of MMS to health facilities (iii) Provision of MMS to PW based on the number of ANC consultation (divide up the quantity/bottle into the number of consultations) (iv) Monitor MMS consumption among PW by checking quantity available in the bottle during each ANC consultation (v) Training of health providers and community health workers on MMS promotion and stock management (vi) Sensitization to MMS during ANC consultations (vii) Procurement of MMS under two forms: tablets and syrup

		(vi) Stock out in health facilities		(viii) Community platforms could be used to improve access to MMS (ix) Purchase of MMS in advance to prevent stock out
Access to and consumption of MMS	Cost of MMS Non acceptance of MMS by health providers Non acceptance of MMS by communities Availability of MMS MMS packaging and utilization	(i) Absence of a funding mechanism to procure MMS (at the state and partner level) (ii) Lack of knowledge about the product among health providers (iii) Lack of knowledge about the product in communities (iv) Lack of knowledge on how to procure MMS, storage conditions and available packaging (v) Lack of knowledge about MMS available form (e.g. tablet, syrup), size of the tablet, quantity to be prescribed, posology, taste	(i) Support from local communities (ii) Availability of a health insurance scheme to cover some MMS cost (iii) Available of documentation on MMS (iv) Availability of different packaging for MMS (v) New product, new taste? (vi) Adequate stock management in most pharmacies and warehouses (vii) Adequate mechanism for transportation and storage in place (viii) Availability of appropriate MMS packaging	(i)To secure a budget line to procure MMS (ii) Training of health providers on MMS (iii) Sensitization to communities and health providers on MMS (iv) Strengthening capacities of warehouse attendants on stock management (v) Advocacy toward pharmaceutical companies to get appropriate MMS packaging



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