Pre-workshop meeting

Highlights of Research Lot #1: INSIDER (Integrated Strategies for Micronutrient Deficiencies)

Key Findings

4 March 2022

"Strengthening national capacities in food fortification"

Institut de Recherche pour le Développement FRANCE
French National Research Institute for Sustainable Development

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Food Fortification Advisory Services
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Landell Mills

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Global Alliance for Improved Nutrition

30 years agrinatura

OUTLINE

1. Description of research framework
2. Key findings of phase 1 and phase 2
3. Multiple Criteria Mapping (MCM) methodology
4. Key findings MCM
5. Policy and programmatic implications
6. Opportunities for further research

PROJECT FRAME WORK

Phase 1

Translation of data into evidence

- Prevalences of micronutrient deficiencies in West Africa → *How big is the problem ?*
- Strategies implemented in West Africa → *What is being done ?*

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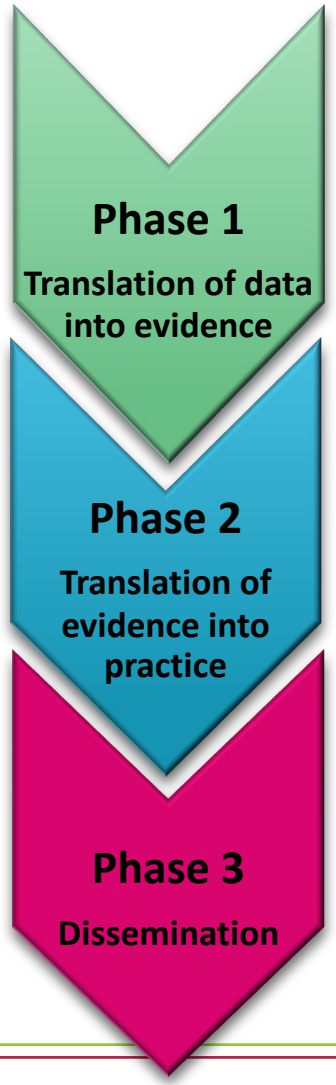
Phase 2

Translation of evidence into practice

- Barriers and opportunities for the implementation and monitoring of strategies are documented in four countries (MCM) → *What can be improved ?* / *Would this be acceptable ?*

PROJECT FRAME WORK



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- Barriers and opportunities for the implementation and monitoring of strategies are documented in four countries (MCM) → *What can be improved ?* / *Would this be acceptable ?*

- Dissemination to stakeholders, beneficiairies and scientific networks → *Data sharing*

KEY FINDINGS

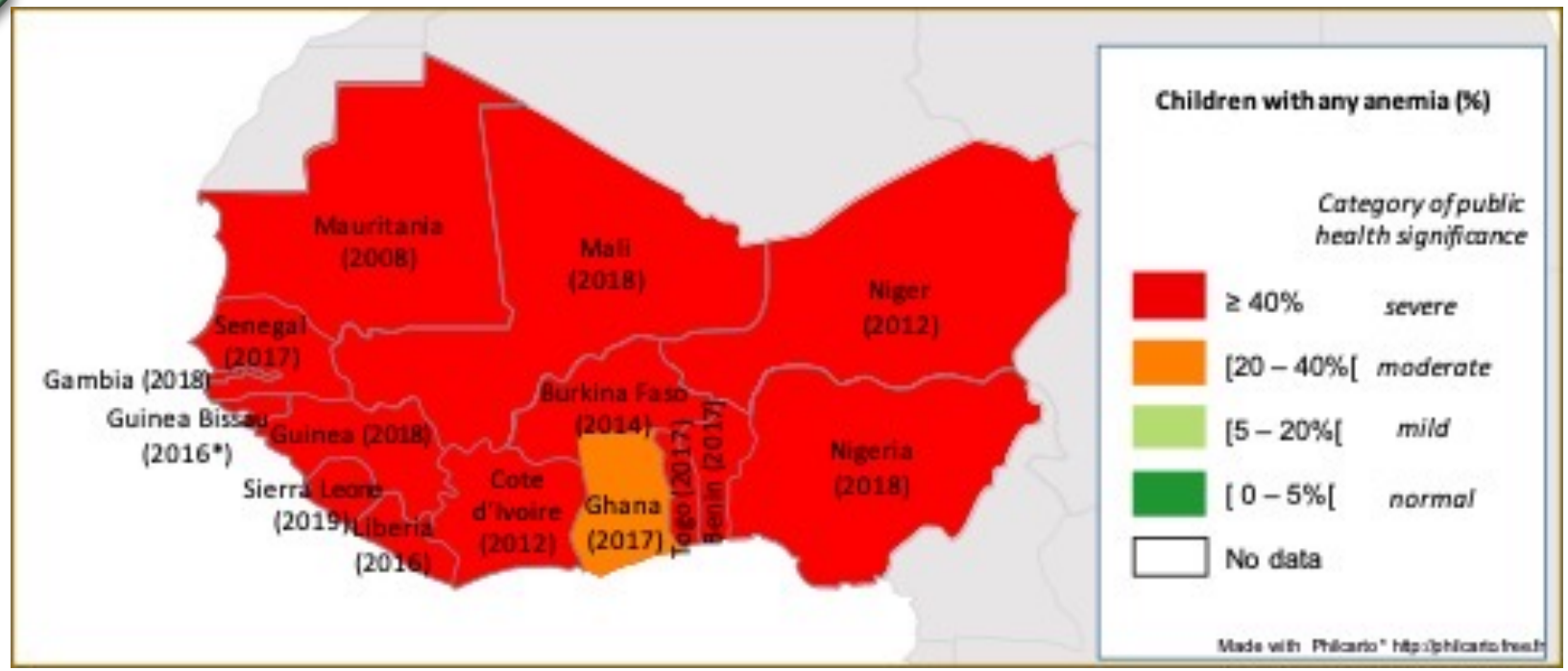
KEYS FINDINGS

Phase 1

Translation of data into evidence

How big is the problem ?

Anemia in <5's



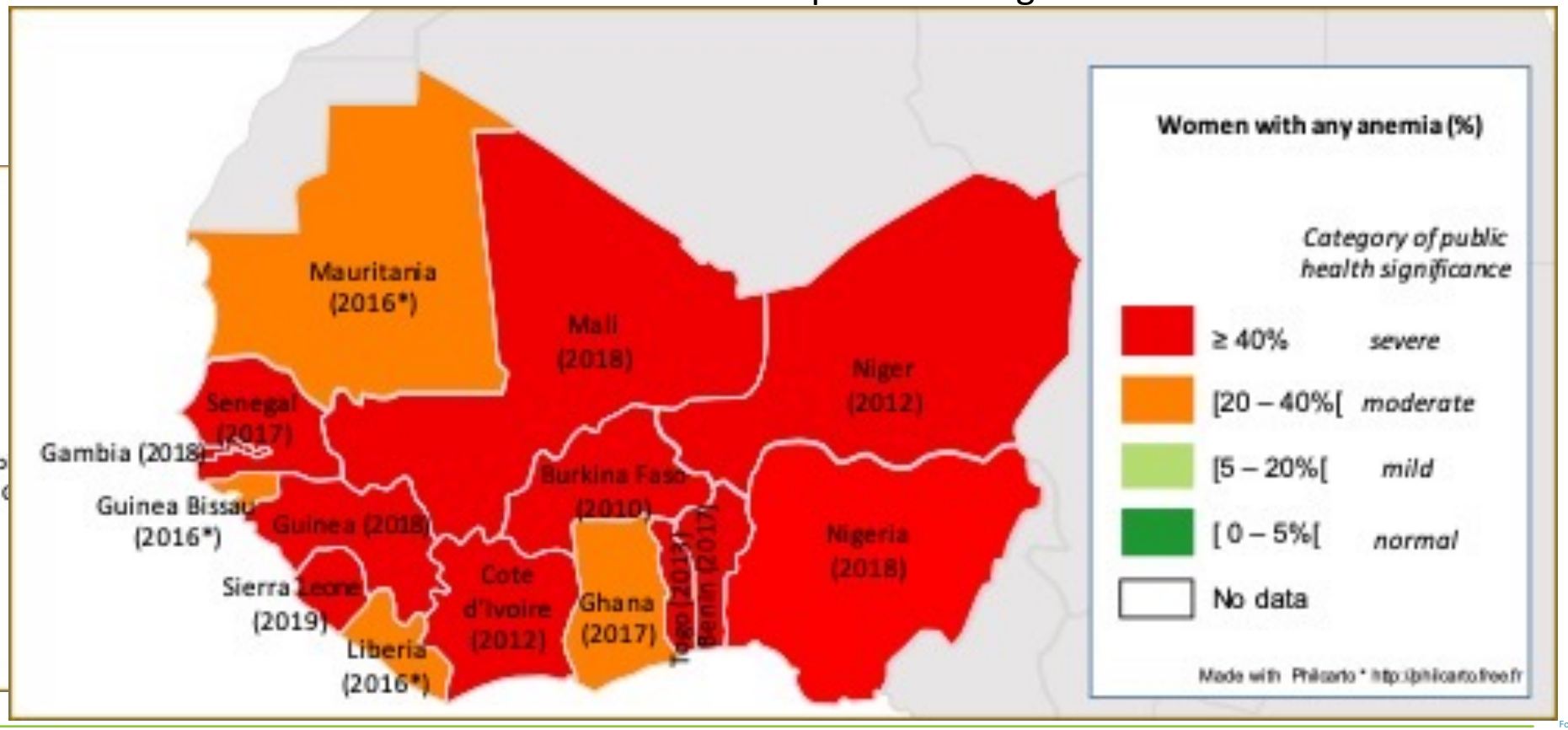
KEYS FINDINGS

Phase 1

Translation of data into evidence

How big is the problem ?

Anemia in women of reproductive age



KEYS FINDINGS

Phase 1

Translation of data into evidence

How big is the problem ?

		Iron	Zinc	Vitamin A	Folic Acid	Vit. B12
Benin	<5's	23.6%	55%	33.6%	??	??
2010-2014	WRA	18.3%	??	17.7%	??	??
Burkina Faso	<5's	0% - 51%	35%-73.5%	18.4% – 30.6%	??	??
2008-2014	WRA	3% - 12%	25.6% - 53.0%	6.0% - 17.9%	??	??
Cote Ivoire	<5's	15.5%	??	24.1%	??	??
2007	WRA	16.7%	??	0.8%	86.1%	18.1%
Ghana	<5's	21.5%	??	20.8%	??	??
2017	WRA	13.7%	??	1.5%	53.8%	6.9%
Mali	<5's	??	??	??	??	??
2007 (n=60)	WRA	25%	??	??	??	??
Nigeria	<5's	6.7% - 29.2%	??	16.9%	??	??
2007 - 2014	WRA	9.6%	??	3.4%	??	??
Sierra Leone	<5's	5.2%	??	17.4%		
2013	WRA	8.3%	??	1.8%	79.2	0.5%%

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KEYS FINDINGS

Phase 1

Translation of data into evidence

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KEYS FINDINGS

Phase 1

Translation of data into evidence

How big is the problem ?

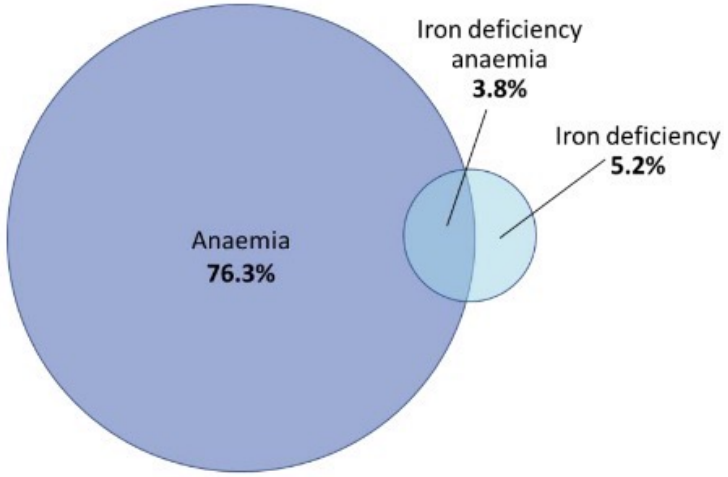
Evaluating causes of anaemia and multi-sectoral efforts for anaemia reduction in Sierra Leone

INSIDER Project

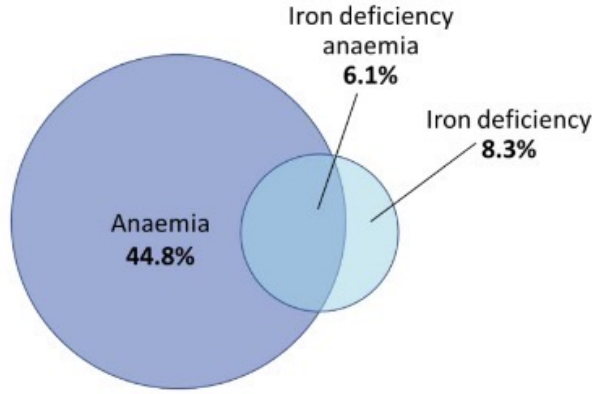
Task 1-4: Case study

Julia de Bruyn
Aurélie Bechoff

Natural Resources Institute,
University of Greenwich



Children 6-59 months



Non-pregnant women, 15-49 years

→ Iron deficiency NOT associated with anaemia

→ Vitamin A deficiency and infectious diseases (diarrhea, malaria, inflammation) associated

KEYS FINDINGS

Phase 1

Translation of data into evidence

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KEYS FINDINGS

Phase 1

Translation of data into evidence

What is being done ?

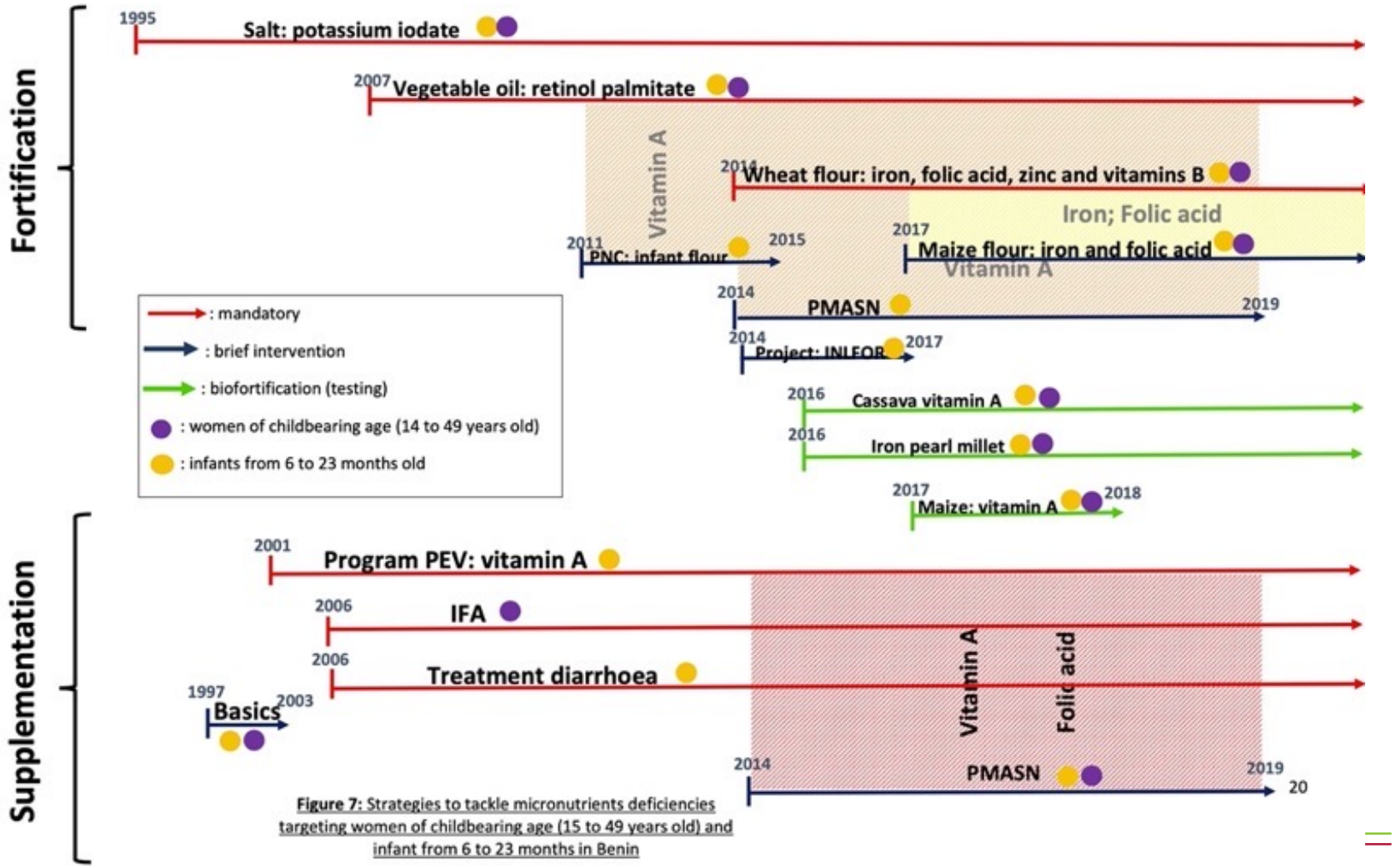


Figure 7: Strategies to tackle micronutrients deficiencies targeting women of childbearing age (15 to 49 years old) and infant from 6 to 23 months in Benin

KEYS FINDINGS

Phase 1

Translation of data into evidence

What is being done ?

nutrients

MDPI

Article

Comparison of Micronutrient Intervention Strategies in Ghana and Benin to Cover Micronutrient Needs: Simulation of Bene-Fits and Risks in Women of Reproductive Age

Mamta Dass [1,2], Jolene Nyako [3], Charles Tortoe [3], Nadia Fanou-Fogny [4], Eunice Nago [4], Joseph Hounhouigan [4], Jacques Berger [1,2], Frank Wieringa [1,2] and Valerie Greffeuille [1,2,*]

Table 1. Combination of interventions included in the scenarios proposed for non-pregnant and non-lactating women (NPNL), and pregnant or lactating women (P/L), in urban (U) and rural (R) settings.

	Benin				Ghana			
	NPNL		P/L		NPNL		P/L	
	U	R	U	R	U	R	U	R
Basic diets	X	X	X	X	X	X	X	X
Fortification								
Salt	X	X	X	X			X	X
Oil	X	X	X	X	X	X	X	X
Wheat flour	X		X		X		X	
Biofortification								
Maize					X	X	X	X
Sweet potatoes					X	X	X	X
Supplementation								
IFA			X	X			X	X
High-dose Vit A							X	X
MN-rich food								
Red palm oil	X	X	X	X	X	X	X	X
Fried tilapia	X	X			X	X		
Mango	X	X	X	X	X	X	X	X
Fortified biscuit			X	X			X	X

KEYS FINDINGS

Phase 1

Translation of data into evidence

What is being done ?

Non-pregnant WRA

More interventions

…

….

Better coverage

Table 3. Micronutrient intakes from diet and interventions and coverage of recommendations for non-pregnant, non-lactating women in Benin and Ghana in urban (U) and rural (R) settings. Shaded cells indicate when recommendations or limits are reached.

		Non-Pregnant Women (Benin)												Non-Pregnant Women (Ghana)									
		Fe (mg)		Zn (mg)		Vit. A ** (µg RE)		Niacin (mg)		Folate (µg)		Iodine (µg)		Fe (mg)		Zn (mg)		Vit. A ** (µg RE)		Niacin (mg)		Folate (µg)		Iodine (µg)	
		U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R
Diet		14.2	5.0	8.0	2.5	285	146	9.9	3,9	372	134	0.8	0	10.3	5.8	5.7	3.6	249	62	9.4	9.1	188	91	0.3	0
	% EAR *	48	17	196	61	80	41	90	35	116	42	1	0	35	20	139	87	70	17	85	83	59	28	0	0
	% RNI *	24	9	164	51	57	29	70	28	93	33	1	0	18	10	116	73	50	12	67	65	47	23	0	0
	% UL *	32	11	18	6	10	5	28	11	37	13	0	0	23	13	13	8	8	2	27	26	19	9	0	0
Diet + Mandatory fortification		21.3	5.0	14.5	2.5	1934	804	14.1	3.9	687	134	281	354.2	13.9	9.6	7.4	5.4	695	441	13.0	12.9	317	225	107	41
	% EAR	72	17	354	61	542	225	128	35	215	42	263	331	47	33	181	132	195	124	118	117	99	70	100	38
	% RNI	36	9	296	51	387	161	101	28	172	33	187	236	24	16	151	110	139	88	93	92	79	56	71	27
	% UL	47	11	32	6	64	27	40	11	69	13	26	32	31	21	16	12	23	15	37	37	32	23	10	4
Diet+ fortification+ Biofortification														13.3	21.1	7.3	12.4	938	781	10.9	31.2	304	392	107	41
														45	72	178	302	263	219	99	284	95	122	100	38
														23	36	149	252	188	156	78	223	76	98	71	27
														29	47	16	27	31	26	31	89	30	39	10	4
All + MN *** rich food except red palm oil		23.7	7.2	15.7	3.5	2144	1015	17.5	7.1	733	177	281	354.2	15.5	11.5	8.3	6.2	2678	735	14.1	16.1	347	258	107	41
	% EAR	81	24	383	85	600	284	159	65	229	55	263	331	53	39	202	151	750	206	128	146	109	81	100	38
	% RNI	40	12	321	71	429	203	125	51	183	44	187	236	26	20	169	126	536	147	101	115	87	65	71	27
	% UL	53	16	35	8	71	34	50	20	73	18	26	32	34	26	18	14	89	24	40	46	35	26	10	4
All+ fortification except oil fortification		23.7	7.3	15.5	3.5	6777	2866	17.4	7.1	730	177.4	281	354	15.4	11.6	8.3	6.1	1148	2278	14.1	10.2	347	254	107	41
	% EAR	80	25	378	85	1898	803	158	65	228	55	263	331	52	39	202	149	322	638	128	92	109	79	100	38
	% RNI	40	12	316	71	1355	573	124	51	183	44	187	236	26	20	169	125	230	456	101	73	87	63	71	27
	% UL	53	16	34	8	226	96	50	20	73	18	26	32	34	26	18	14	38	76	40	29	35	25	10	234

* % of the EAR, RNI or UL covered by the diet and interventions. EAR: estimated average requirements; RNI: recommended nutrient intakes; UL: upper limits; ** Vit A: vitamin A; *** MN: micronutrients.

PHASE 2 : KEY RECOMMENDATIONS

Phase 2

Translation of evidence into practice

What can be improved ?

2-1 Policy recommendations for micronutrient deficiencies reduction in Benin

2-1-1 Core recommendations in Benin

1. Promote fortification of commonly consumed cereals (e.g. maize, sorghum, millet) and food-to-food fortification of common foods (including complementary foods) using local food resources, at domestic level and in small-scale production units

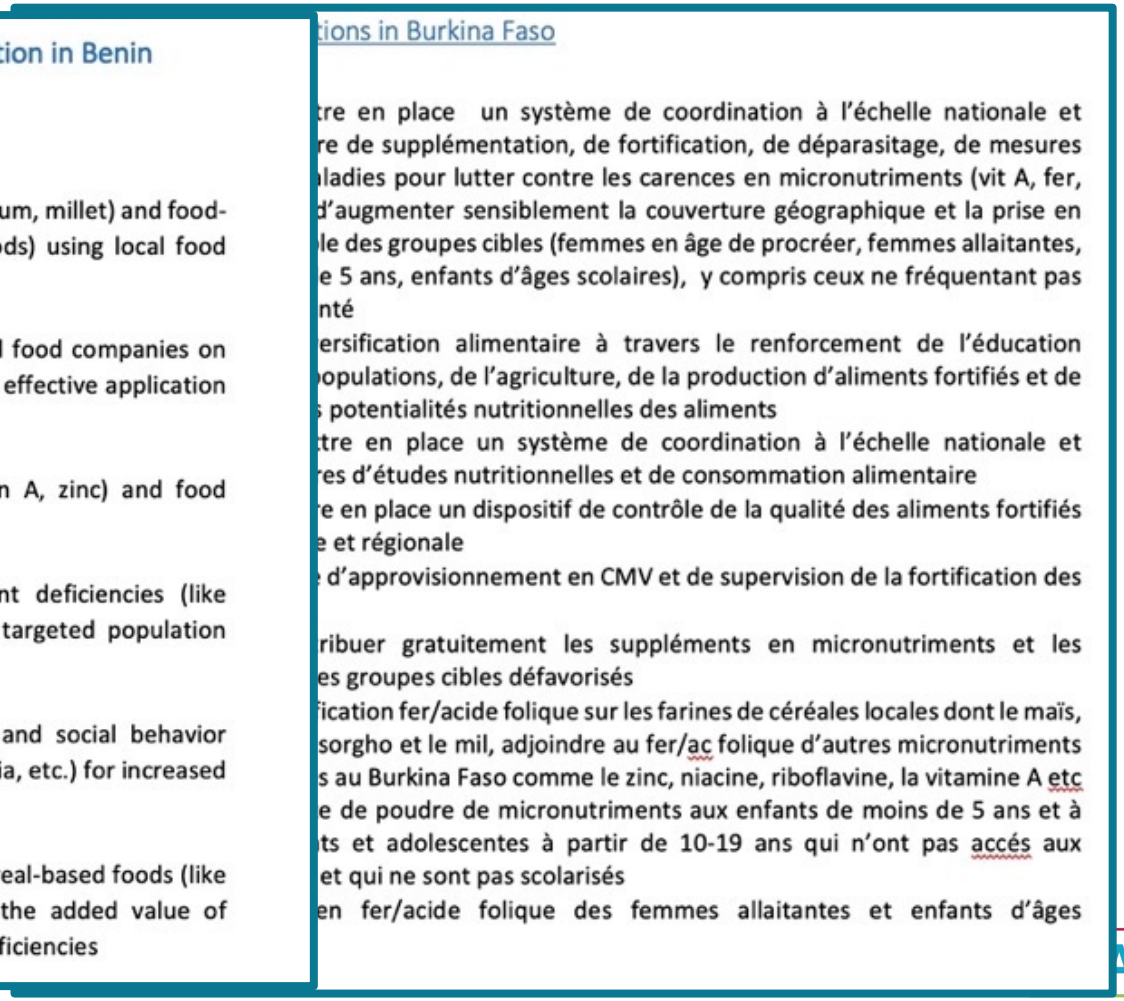
2. Enhance the technical and material capacities of control agencies and food companies on food fortification to ensure quality control and take legal sanctions for effective application of mandatory mass fortification of wheat flour, vegetable oil and salt

3. Develop a monitoring system for national supplementation (vitamin A, zinc) and food fortification (wheat flour, oil, salt) programs

4. Enhance established public health measures to fight micronutrient deficiencies (like deworming, free distribution of mosquito nets, free healthcare for targeted population groups, supply of potable water, handwashing devices and latrines)

5. Strengthen promotional activities (home-garden, fisheries, poultry) and social behavior change communication (through ongoing development programs, media, etc.) for increased household dietary diversification and better nutritional practices

6. Encourage research to promote the fortification of most consumed cereal-based foods (like maize flour and infant flour) and biofortification and to evaluate the added value of established public health measures in fighting various micronutrient deficiencies



ions in Burkina Faso

tre en place un système de coordination à l'échelle nationale et
re de supplémentation, de fortification, de déparasitage, de mesures
ladies pour lutter contre les carences en micronutriments (vit A, fer,
d'augmenter sensiblement la couverture géographique et la prise en
le des groupes cibles (femmes en âge de procréer, femmes allaitantes,
e 5 ans, enfants d'âges scolaires), y compris ceux ne fréquentant pas
nté
ersification alimentaire à travers le renforcement de l'éducation
opulations, de l'agriculture, de la production d'aliments fortifiés et de
potentialités nutritionnelles des aliments
tre en place un système de coordination à l'échelle nationale et
es d'études nutritionnelles et de consommation alimentaire
e en place un dispositif de contrôle de la qualité des aliments fortifiés
et régionale
d'approvisionnement en CMV et de supervision de la fortification des

ribuer gratuitement les suppléments en micronutriments et les
es groupes cibles défavorisés
fication fer/acide folique sur les farines de céréales locales dont le maïs,
sorgho et le mil, adjoindre au fer/ac folique d'autres micronutriments
s au Burkina Faso comme le zinc, niacine, riboflavine, la vitamine A etc
e de poudre de micronutriments aux enfants de moins de 5 ans et à
ts et adolescentes à partir de 10-19 ans qui n'ont pas accés aux
et qui ne sont pas scolarisés
en fer/acide folique des femmes allaitantes et enfants d'âges

KEY RECOMMENDATIONS

Phase 2

Translation of evidence into practice

→ *What can be improved ?*

1. National coordination of nutrition actions
2. Promotion of dietary diversification
3. Developing and supporting food fortification programs
4. Quality control of fortified foods
5. Support of community actions
6. Multiple-micronutrient supplementation for vulnerable groups
7. Integrated actions (WASH / Nutrition / MCH)

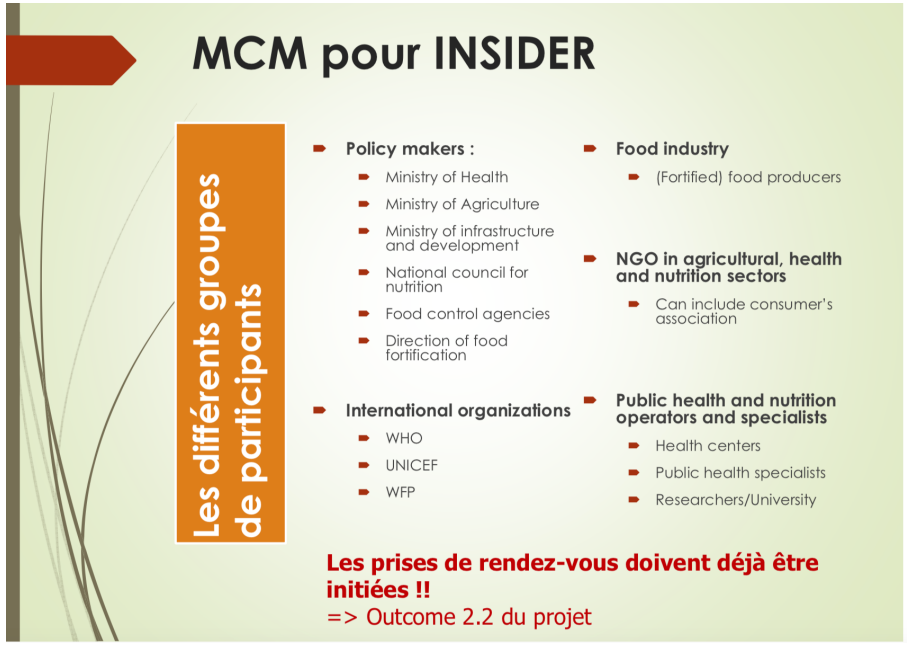
(8. Collect more data. National micronutrient surveys ?)

MCM METHODOLOGY

Phase 2

Translation of evidence into practice

→ *Are the recommendations acceptable ?*



MCM = multiple criteria mapping of views from stakeholders

↓

Around 20 – 25 interviews in total

Each recommendation is ‘weighed’ based on 5 criteria

MCM METHODOLOGY

Phase 2

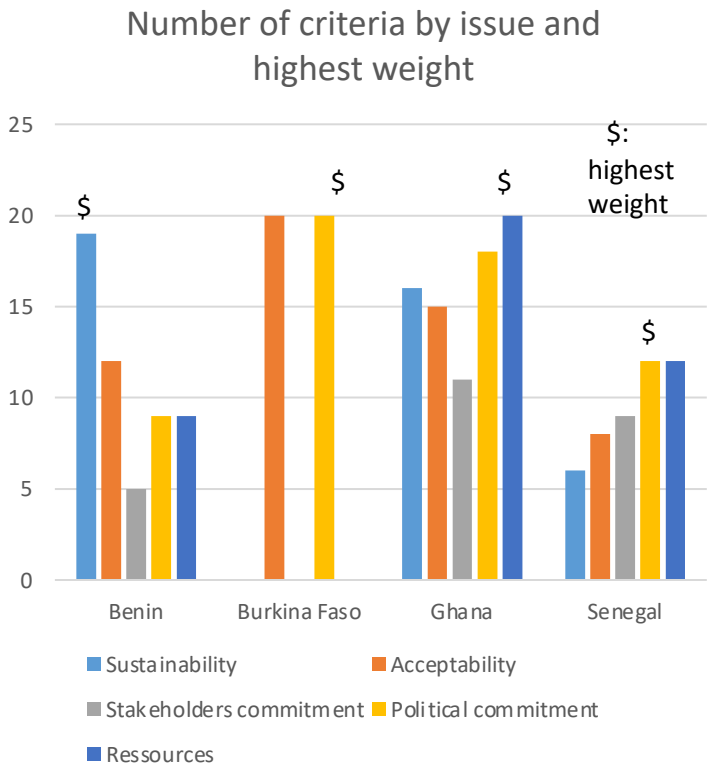
Translation of evidence into practice

→ *Are the recommendations acceptable ?*

- Participants must give a **weight** to each criteria
- What is the most important criteria considered for the appraisal of an intervention?

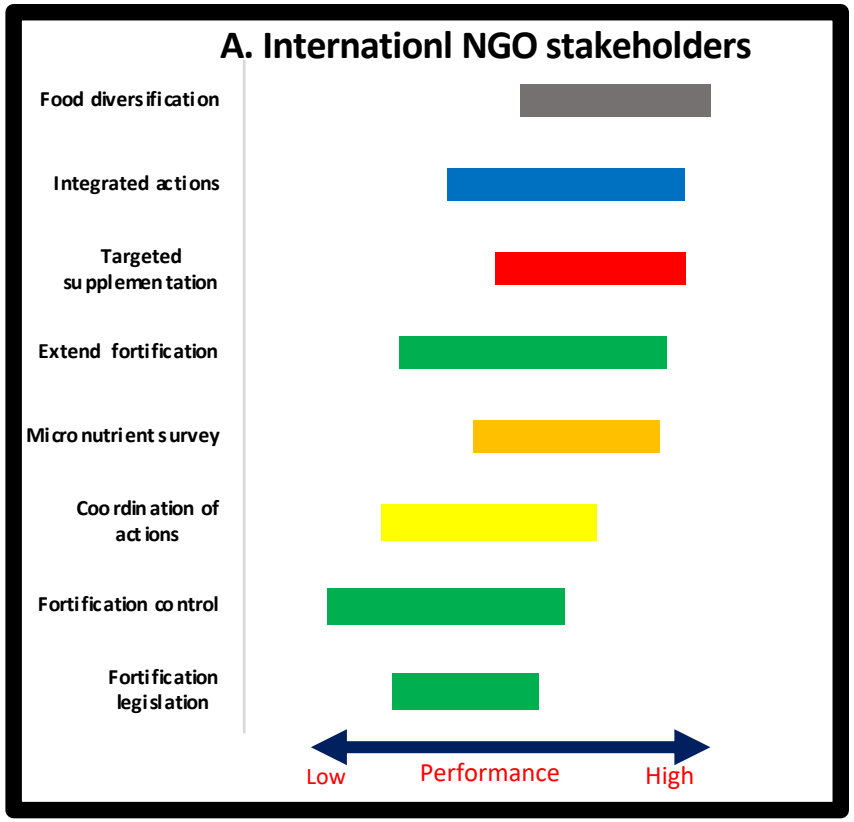
All the stakeholders together (Senegal)

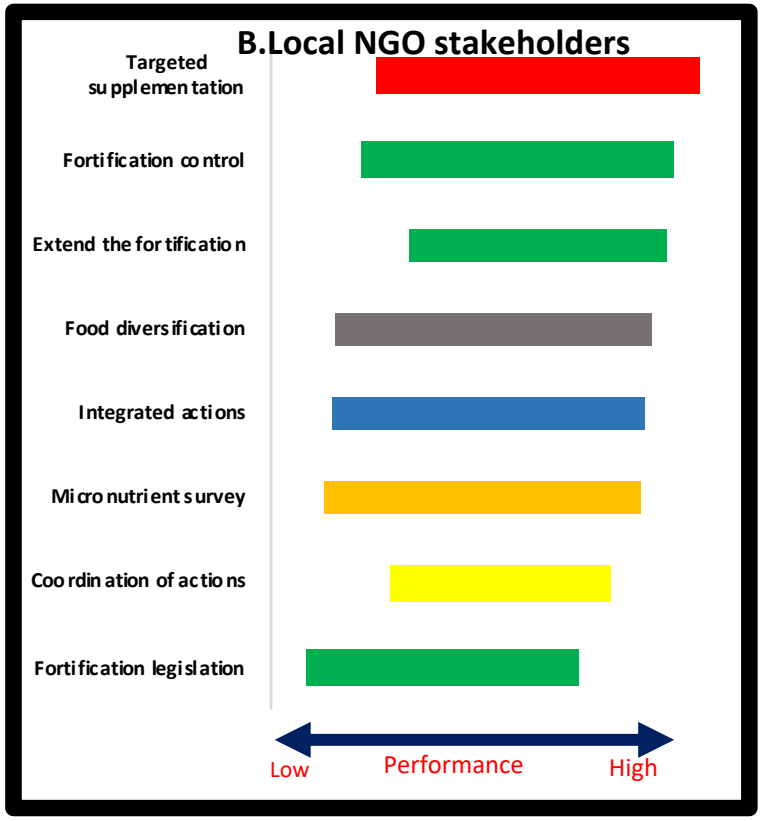
MCM KEY FINDINGS

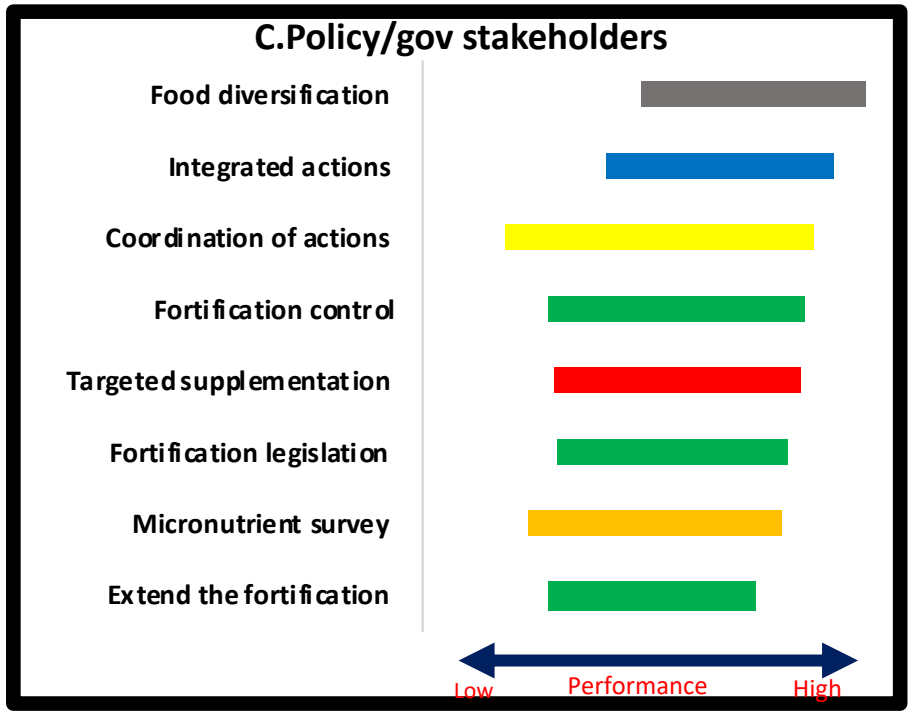


- **Resources**, **policy commitment** and **sustainability** (impact) were the most chosen criteria to appraise the interventions

KEY FINDINGS MCM – EXAMPLE GHANA







NO consensus among stakeholders which option is best !!

EXAMPLE OF GHANA

...” *Food diversification There is no improvement. We don't have dietary guidelines as a country....so how do you guide diversification*’’. Stakeholder 12 Food Industry/Regulator

… “*Food diversification supports good nutrition and eating habits, especially for children, by choosing foods with high nutrient value, in the right amounts and balance for improved health and well-being*’’, Stakeholder 2 International 2 NGO

…”*It’s the new craze, currently everyone is talking about diet diversification because that where the money is, donors are interested so government is rolling out all these, planting for food and jobs and animal rearing for food and jobs just to attract funders… but truth is but if the*

Dietary diversity : mixed responses…….

KEY FINDINGS MCM

8 potential interventions

- Fortification (3 interventions)
- Targeted supplementation
- Coordination of actions
- National micronutrient survey
- Integrated intervention
- Dietary diversification

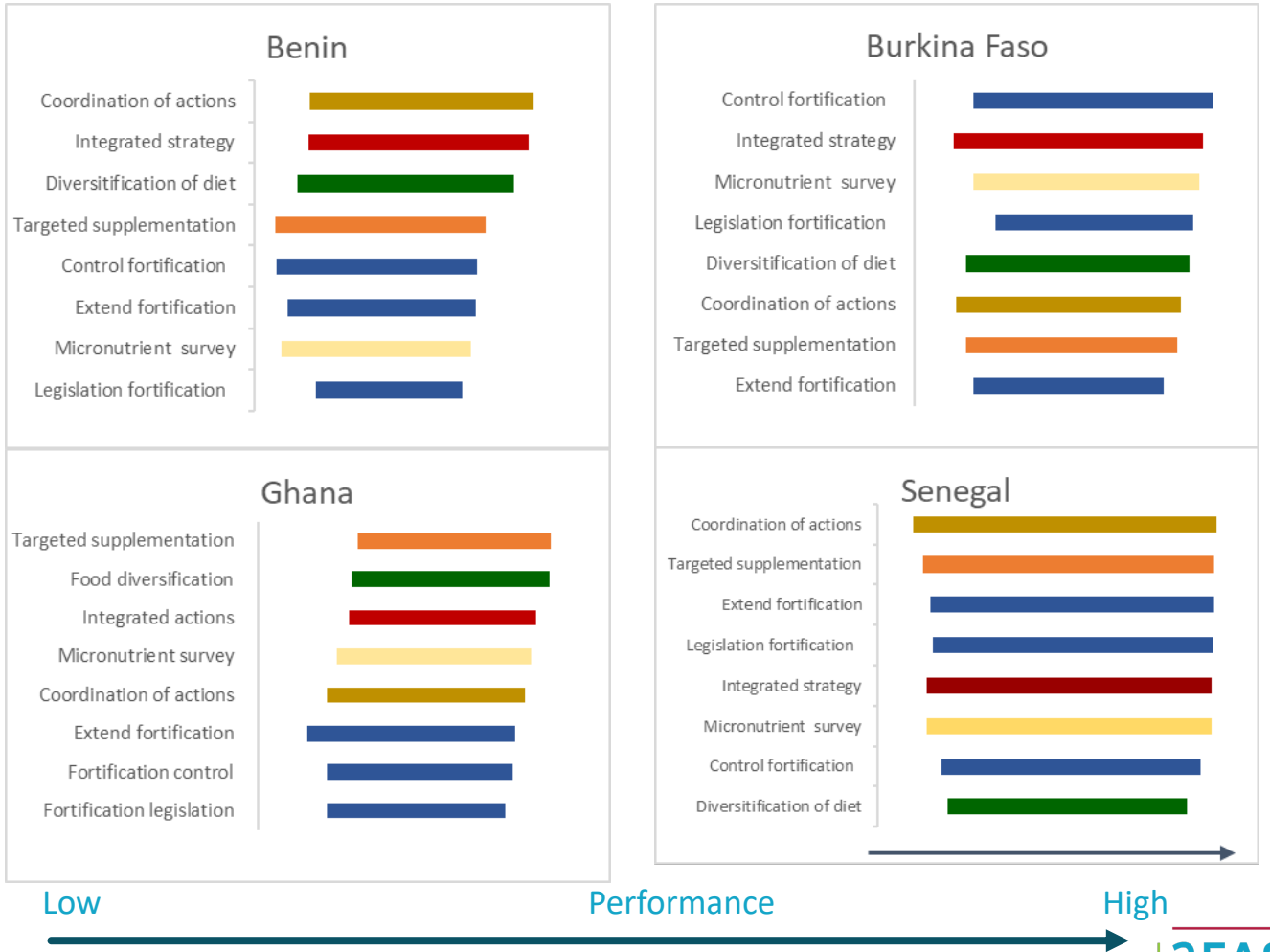
Fortification: Ranked high by Burkina Faso

Supplementation : Ranked high by Ghana

Ghana and Benin would like to have **scientific evidences** of impact

Micronutrient survey: seen as crucial by most stakeholders but concerns about

- resources
- logistics
- capabilities



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CONCLUSIONS KEY FINDINGS

Micronutrient deficiencies are highly prevalent in West-Africa, easily affecting **>50%** of children<5 and WRA

BUT

Data are **scarce** and **old** for West-Africa

Iron and **vitamin A** deficiencies appear less prevalent than e.g. **zinc** and **folate** while programs are targeted mostly at iron and vitamin A

Anemia appears to be a poor indicator of iron status in West Africa and more related to infection and vitamin A deficiency

CONCLUSIONS KEY FINDINGS

Several strategies to combat micronutrient deficiencies are in place in West-Africa, including food fortification and targeted supplementation

Traditional diets are not sufficient in vitamins and minerals
Combination of strategies can cover most micronutrient needs in children and WRA
No evidence for risk of overconsumption

CONCLUSIONS KEY FINDINGS

Recommendations to improve impact of strategies have been formulated

BUT

There is litte consensus among stakeholders which should be prioritised

POLICY AND PROGRAMMATIC IMPLICATIONS, AND DISSEMINATION

POLICY AND PROGRAMMATIC IMPLICATIONS

Micronutrient status data

→ **National representative micronutrient surveys at regular intervals**

→ **Resources, capacity building, opportunities** (e.g. DHS)

Targeting of programs

→ **Wider target of programs** as today mostly iron, iodine and vitamin A

→ **Higher visibility of other micronutrients**

Combination of interventions

→ **Fortification** appears an essential tool as current diets lack most MN

→ **Better coordination (national centers of nutrition?)**

→ **Better quality control (capacity building and means)**

Consensus building

→ **Need** for **clear guidelines / programs** for West Africa

→ **National and regional consensus building**

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DISSEMINATION

nutrients

MDPI

Article

Comparison of Micronutrient Intervention Strategies in Ghana and Benin to Cover Micronutrient Needs: Simulation of Bene-Fits and Risks in Women of Reproductive Age

Mamta Dass [1,2], Jolene Nyako [3], Charles Tortoe [3], Nadia Fanou-Fogny [4], Eunice Nago [4], Joseph Hounhouigan [4], Jacques Berger [1,2], Frank Wieringa [1,2] and Valerie Greffeuille [1,2,*]

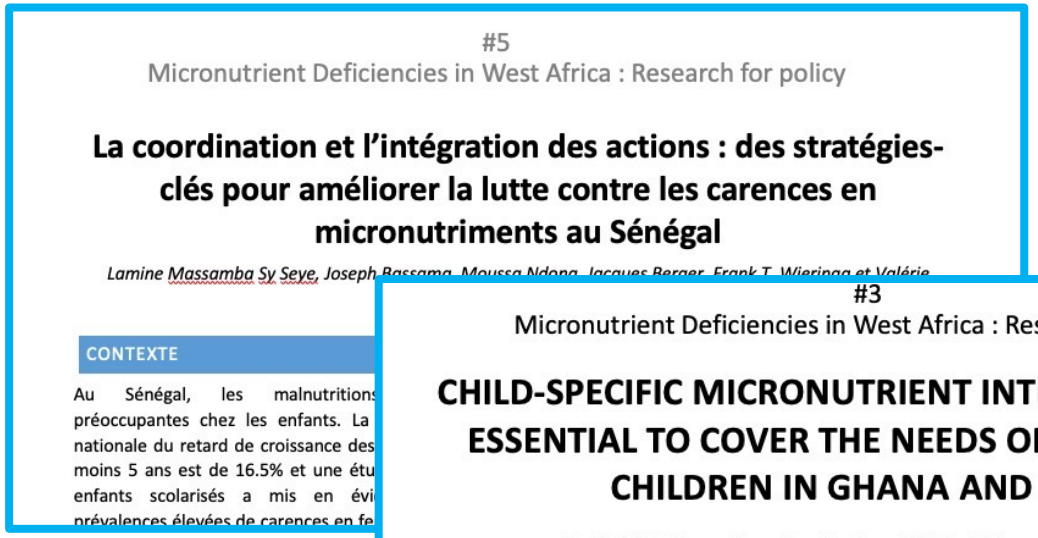
[Note d'orientation politique]

Carences multiples en micronutriments au Bénin: évaluation du potentiel de performance des stratégies de lutte

Nadia Fanou-Fogny, Diane Djossinou, Théodore Tohouenou, Junior Alé, Jacques Berger, Frank Wieringa, Valérie Greffeuille

CONTEXTE

Au Bénin, les carences en micronutriments demeurent un problème de santé publique, malgré la mise en place de plusieurs stratégies de lutte contre la malnutrition et l'insécurité alimentaire des populations vulnérables depuis plusieurs décennies. Les actions visant à changer les comportements, à réduire la pauvreté ou à favoriser l'autonomisation des femmes et des jeunes sont prioritaires. Pour réduire les conséquences des carences nutritionnelles sur la santé et le développement, il est nécessaire d'évaluer comment différentes stratégies de lutte peuvent être



#5

Micronutrient Deficiencies in West Africa : Research for policy

La coordination et l'intégration des actions : des stratégies-clés pour améliorer la lutte contre les carences en micronutriments au Sénégal

Lamine Massamba Sy Seye, Joseph Bassama, Moussa Ndong, Jacques Berger, Frank T. Wieringa et Valérie

CONTEXTE

Au Sénégal, les malnutritions
préoccupantes chez les enfants. La
nationale du retard de croissance des
moins 5 ans est de 16.5% et une étu
enfants scolarisés a mis en évi
prévalences élevées de carences en fe

#3

Micronutrient Deficiencies in West Africa : Research for policy

CHILD-SPECIFIC MICRONUTRIENT INTERVENTIONS ARE ESSENTIAL TO COVER THE NEEDS OF 6-24 MONTHS CHILDREN IN GHANA AND BENIN

Greffeuille V; Fanou-Fogny Hounhouigan J; Nyako J; Berger J and Wieringa F.T

EY MESSAGES

nplementary diets, even

#4

Micronutrient Deficiencies in West Africa : Research for policy

Les approches intégrées de la nutrition, la santé et l'agriculture pour mieux lutter contre les carences en micronutriments au Burkina Faso

Ouattara/Songré Laurencia T., Bationo Fabrice, Compaoré Léontine, Berger Jacques, Greffeuille Valérie et Wieringa Frank T.

Questions de recherche

- Quelles stratégies de lutte contre les carences en micronutriments sont les plus soutenues par les acteurs de la nutrition au Burkina Faso ?

MESSAGES-CLEF

→ Un meilleur contrôle de la qualité

2FAS

Food Fortification Advisory Services
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OPPORTUNITIES FOR FURTHER RESEARCH

FURTURE RESEARCH

ANEMIA

- **Link between infection disease, WASH and nutrition**
  - **link to functional outcomes (cognitive development)**

IMPACT

- **Pre- post-evaluation of programs**
  - Translated into e.g. cost-benefit ratios etc.

FIELD-FRIENDLY METHODS

- **Quality control** of fortified products
  - **New, innovative** methods (I-check) to check products at factory / outlet / consumer

SPECIFIC TARGET GROUPS

- **How** to make sure we reach the poorest / young children / rural
  - **Market research**
  - **Specific foods** for young children and pregnant women

LIST OF PARTNERS

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National Research Institute for Sustainable Development – UMR Nutripass

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- Agrinatura- European Alliance for agricultural knowledge for development
- Natural Resources Institute – University of Greenwich
- Agropolis International
- Agricultural research and international cooperation organization
- Institut de Recherche en sciences appliquées et technologies
- Gaston Berger University
- Council for Scientific and Industrial Research - Food Research Institute
- Université d'Abomey Calavi- Faculté des Sciences Agronomiques

THANK YOU

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