N4R Nutrition for Resilience

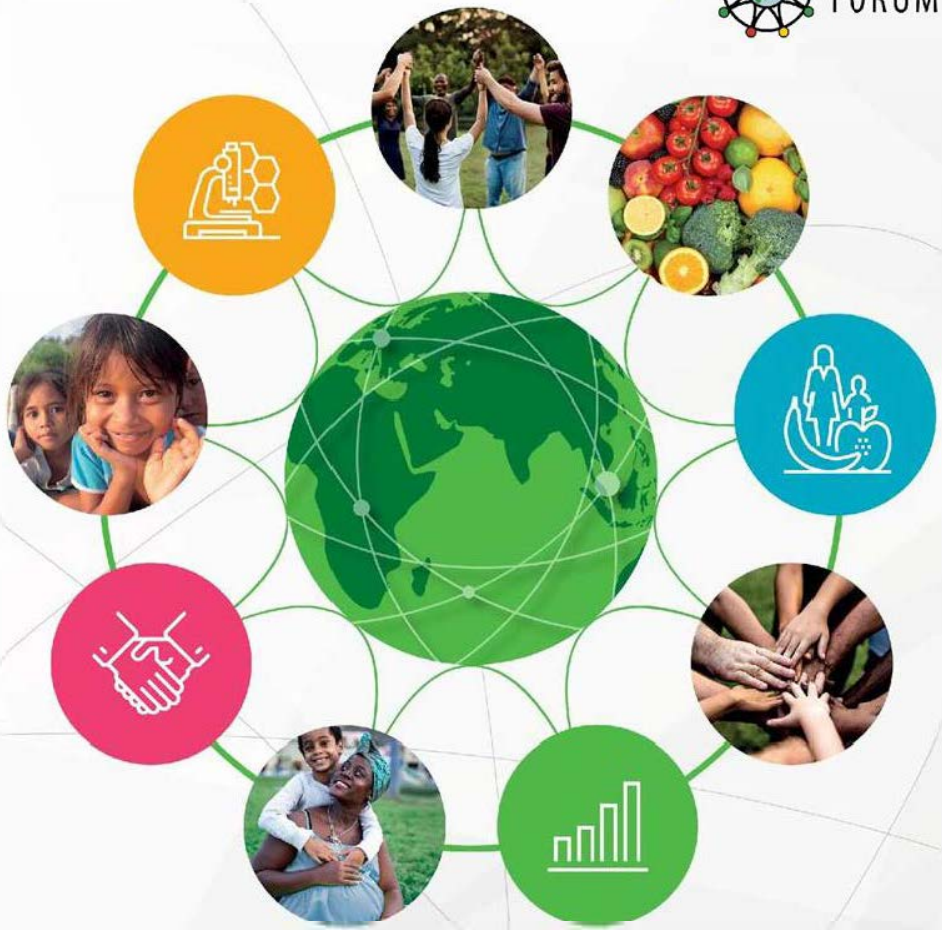
Micronutrient FORUM

Micronutrient Forum 6th Global Conference

The Hague, the Netherlands & Online

16-20 October 2023

Prevention and Control of Micronutrient Deficiencies through Food & Health Systems Actions: What Will be Required to Achieve Complementary Efforts?



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Harmonization of Interventions across Food and Health Systems and Related Data Needs—Conceptual Framework

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Conflicts of Interest

Affiliation/Financial Interests	Organization
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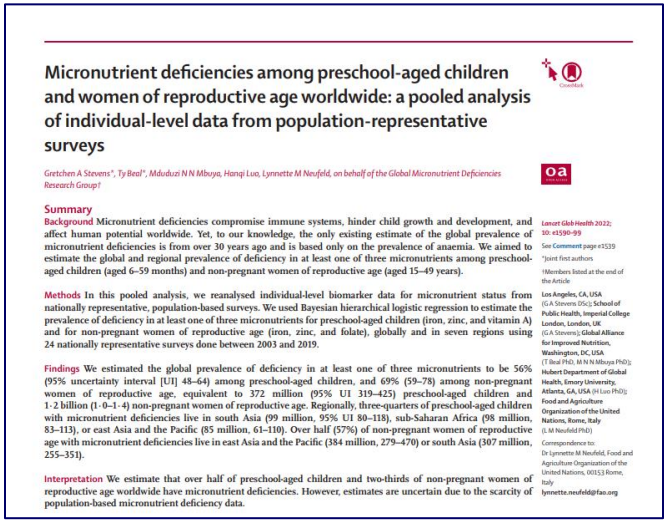
Scientific advisory board/consultant	World Health Organization Micronutrient Forum USAID Advancing Nutrition Bill & Melinda Gates Foundation International Atomic Energy Agency
Stock shareholder	None
Other financial support	None

Estimated Number of Individuals Affected by Micronutrient (MN) Deficiencies Globally



Micronutrient deficiencies among preschool-aged children and women of reproductive age worldwide: a pooled analysis of individual-level data from population-representative surveys

Gretchen A Stevens*, Ty Beal*, Mduduzi N N Mbuya, Hanqi Luo, Lynnette M Neufeld, on behalf of the Global Micronutrient Deficiencies Research Group†

Summary

Background Micronutrient deficiencies compromise immune systems, hinder child growth and development, and affect human potential worldwide. Yet, to our knowledge, the only existing estimate of the global prevalence of micronutrient deficiencies is from over 30 years ago and is based only on the prevalence of anaemia. We aimed to estimate the global and regional prevalence of deficiency in at least one of three micronutrients among preschool-aged children (aged 6–59 months) and non-pregnant women of reproductive age (aged 15–49 years).

Methods In this pooled analysis, we reanalysed individual-level biomarker data for micronutrient status from nationally representative, population-based surveys. We used Bayesian hierarchical logistic regression to estimate the prevalence of deficiency in at least one of three micronutrients for preschool-aged children (iron, zinc, and vitamin A) and for non-pregnant women of reproductive age (iron, zinc, and folate), globally and in seven regions using 24 nationally representative surveys done between 2003 and 2019.

Findings We estimated the global prevalence of deficiency in at least one of three micronutrients to be 56% (95% uncertainty interval [UI] 48–64) among preschool-aged children, and 69% (59–78) among non-pregnant women of reproductive age, equivalent to 372 million (95% UI 319–425) preschool-aged children and 1·2 billion (1·0–1·4) non-pregnant women of reproductive age. Regionally, three-quarters of preschool-aged children with micronutrient deficiencies live in south Asia (99 million, 95% UI 80–118), sub-Saharan Africa (98 million, 83–113), or east Asia and the Pacific (85 million, 61–110). Over half (57%) of non-pregnant women of reproductive age with micronutrient deficiencies live in east Asia and the Pacific (384 million, 279–470) or south Asia (307 million, 255–351).

Interpretation We estimate that over half of preschool-aged children and two-thirds of non-pregnant women of reproductive age worldwide have micronutrient deficiencies. However, estimates are uncertain due to the scarcity of population-based micronutrient deficiency data.

Lancet Glob Health 2022; 10: e1590–99

See Comment page e1539

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Stevens GA *et al.* Lancet Global Health, *2022*.

	Previous Estimate (WHO 1991)	Stevens *et al.* (2022)
Time span	pre-1990	2005–2019
Data source	Anemia	Nationally representative surveys; sentinel MN[1] status biomarkers
Methods for analysis	Poorly described	Rigorous, transparent
Sub-populations considered	All	Under-five children, nonpregnant women of reproductive age (NPWRA)
No. of affected individuals	~ 2 billion	**372 million preschool children (PSC) (56%); 1.2 billion NPWRA (69%)** [2]

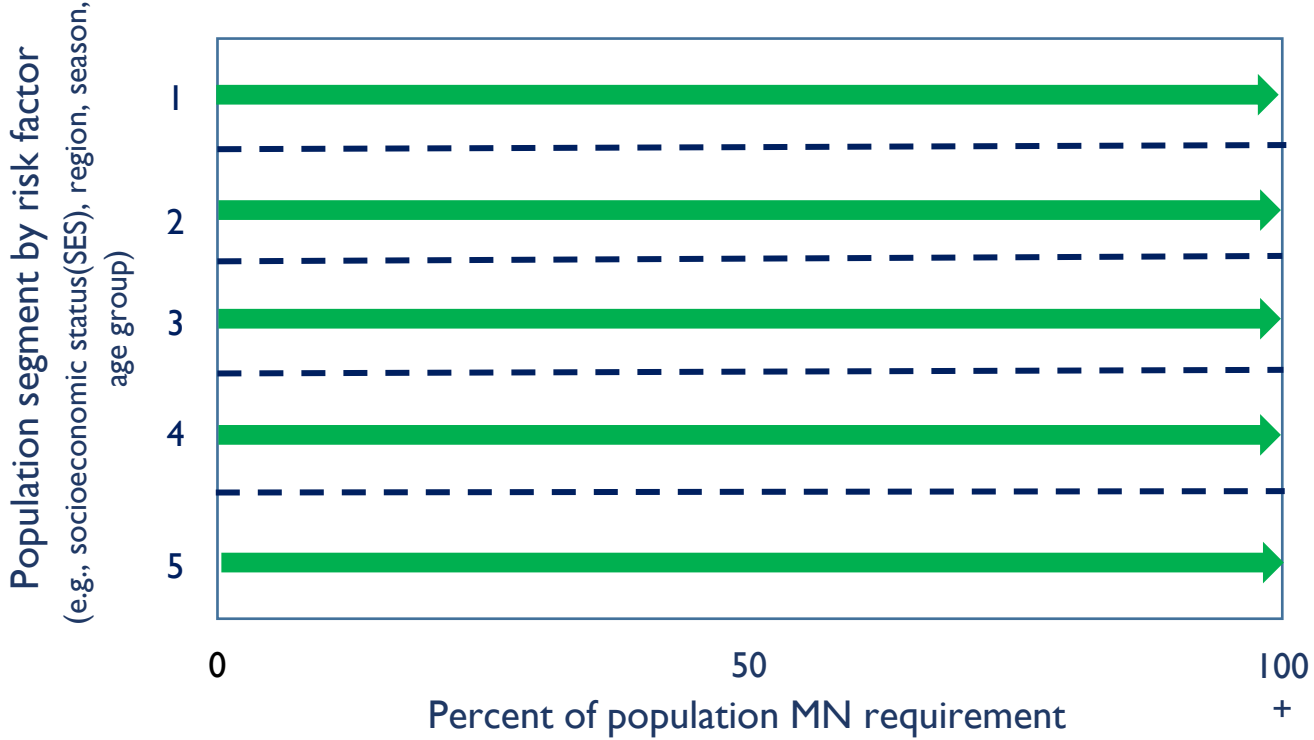
[1]Iron; zinc; vitamins A, D, folate, B12.

[2]Not considering other population sub-groups and other MNs.

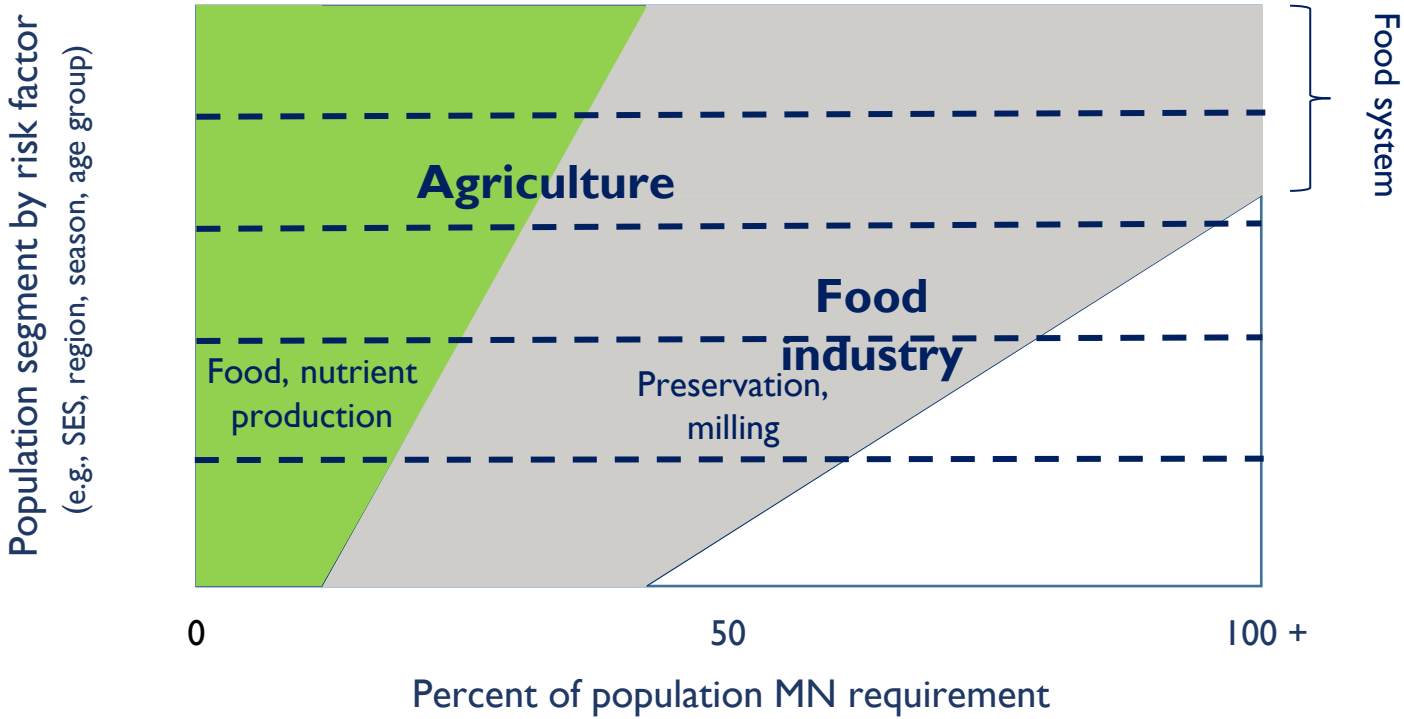
How the Food and Health Systems Work (Mostly Independently) to Provide Nutrients

- Most nutrients are provided by food, but food producers rarely consider nutrient adequacy
- Food industry guided mainly by consumer preferences and profitability, not nutrition
- Health system is concerned with nutrition as it applies to human health, but has limited leverage
- How can these systems work together to provide better nutrition, and what information is needed to harmonize actions?

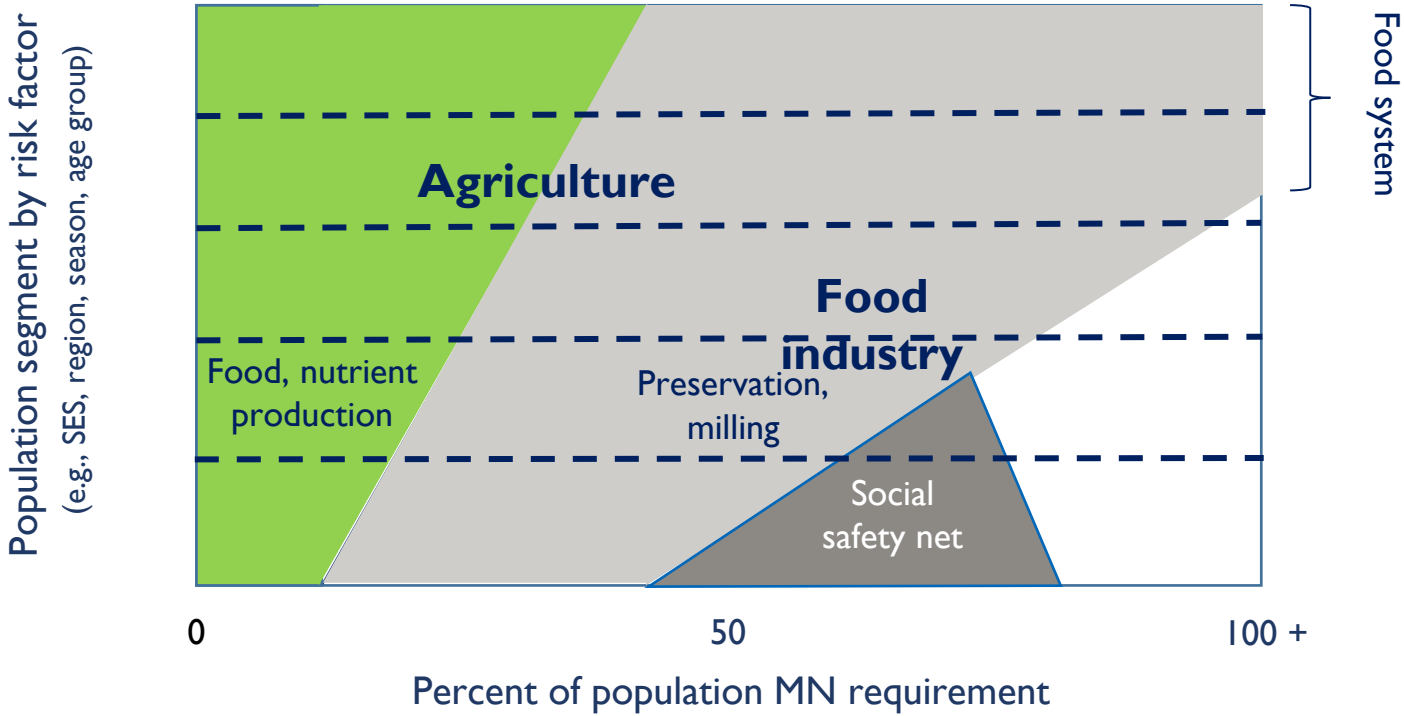
Percent of Population MN Requirement Delivered by the Food System in Relation to Selected Risk Factors



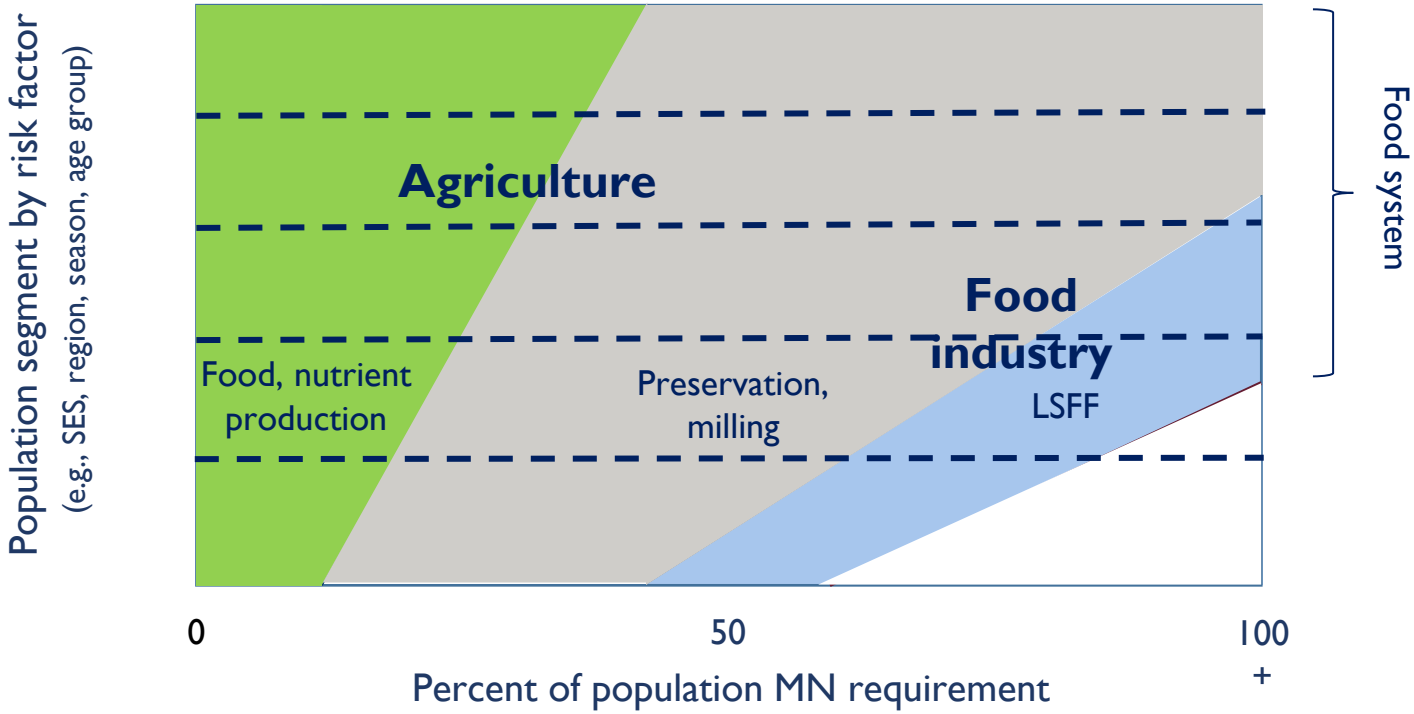
Percent of Population MN Requirement Delivered by Sector in Relation to Selected Risk Factors



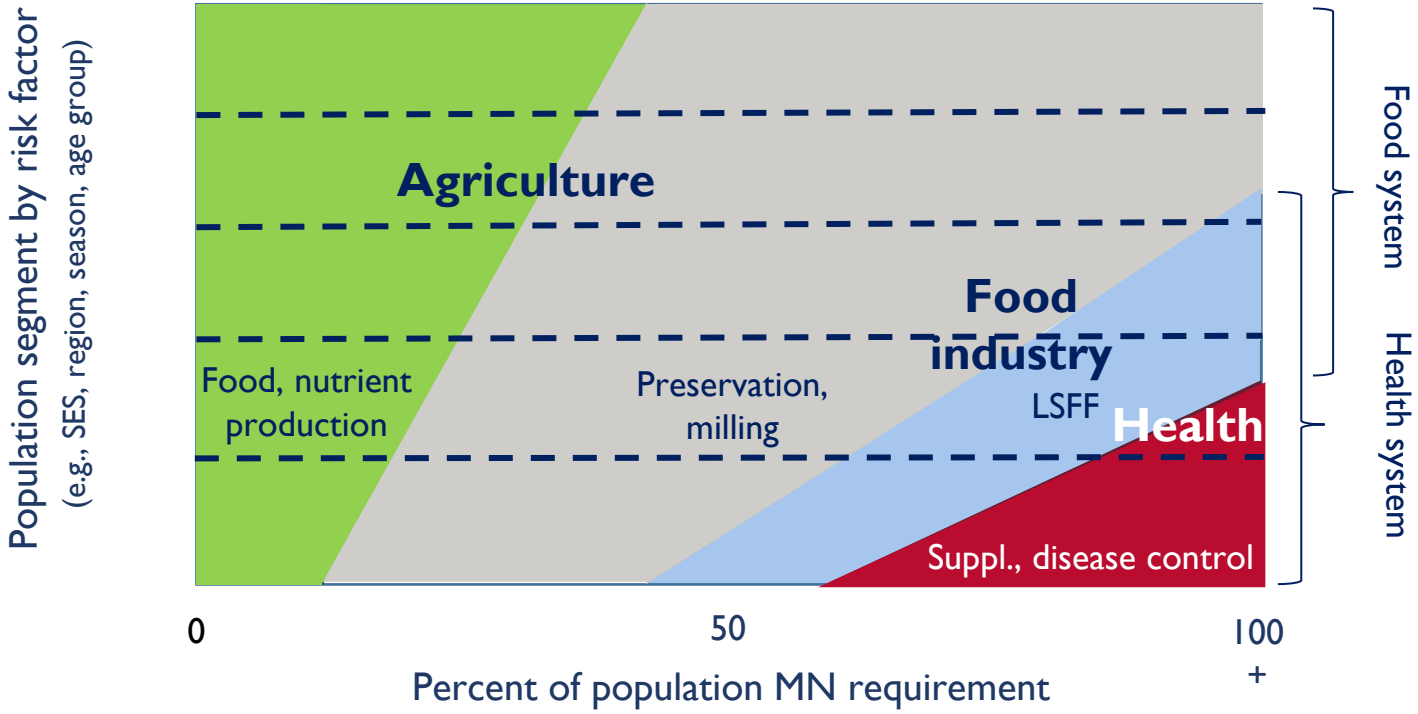
Percent of Population MN Requirement Delivered by Sector in Relation to Selected Risk Factors



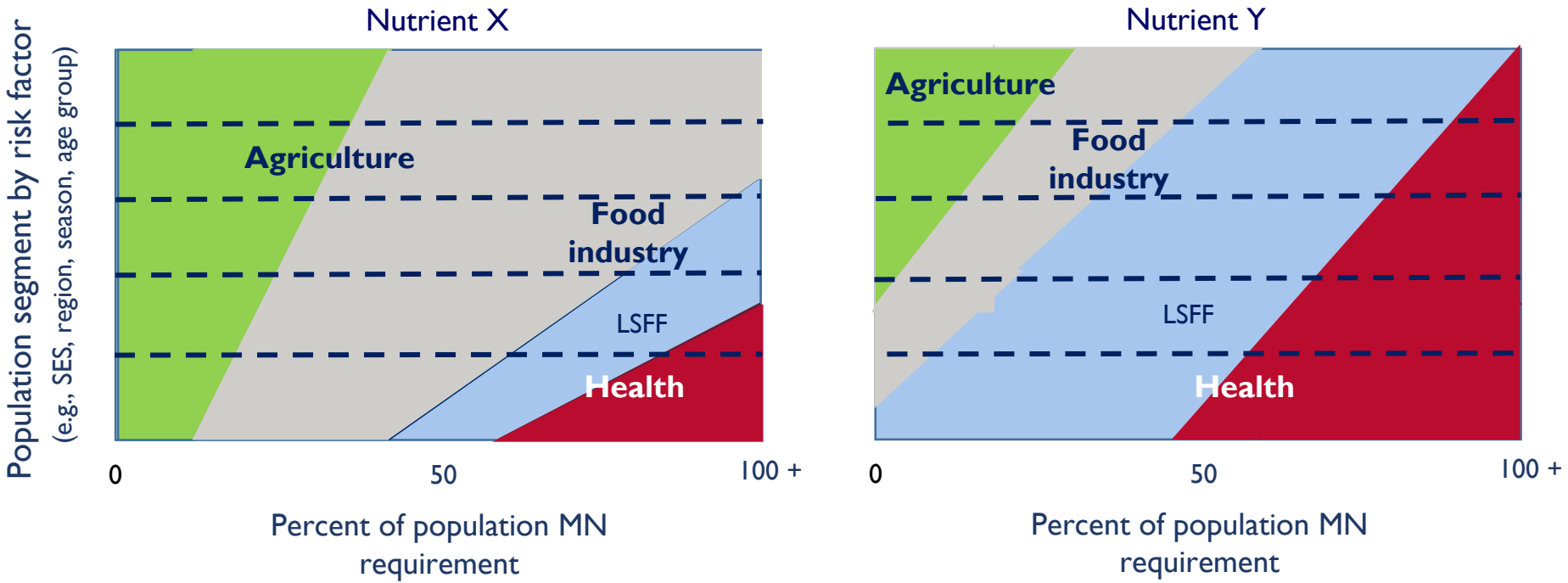
Percent of Population MN Requirement Delivered by Sector in Relation to Selected Risk Factors



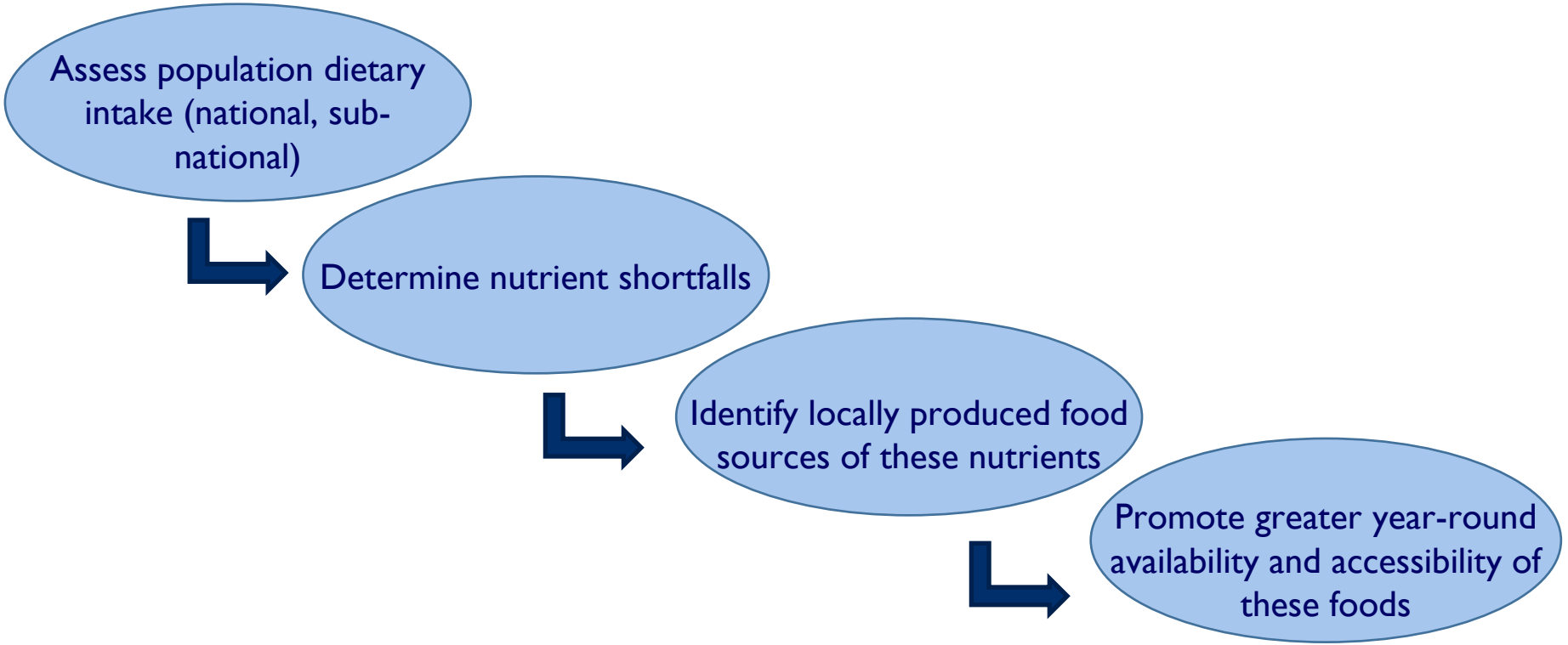
Percent of Population MN Requirement Delivered by Sector in Relation to Selected Risk Factors



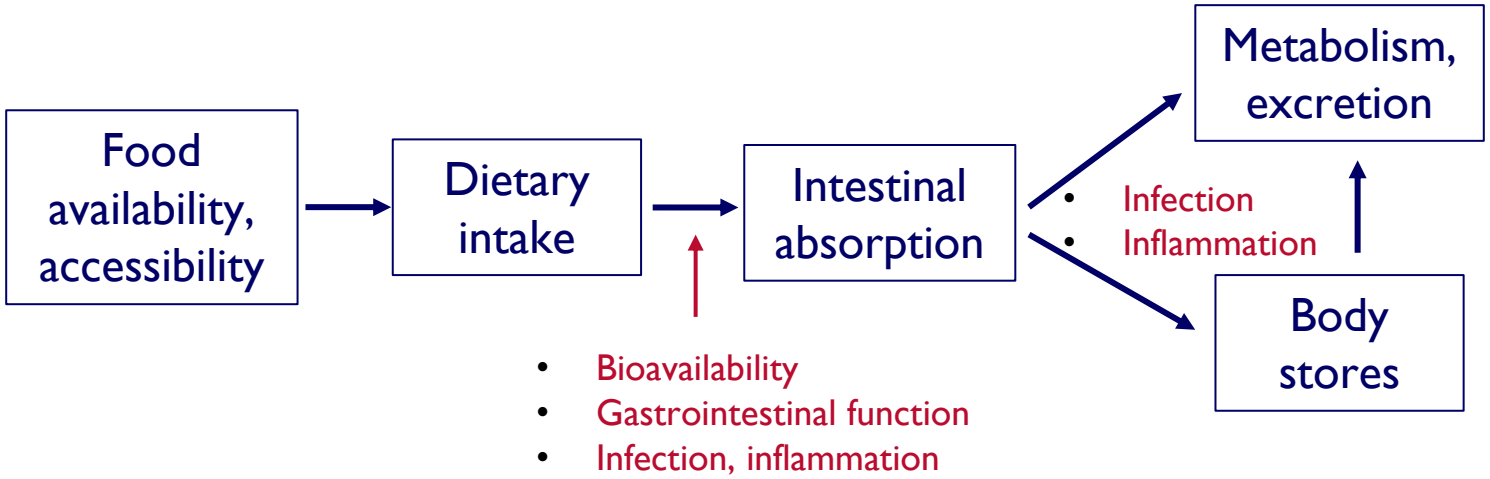
Percent of Population MN Requirement Delivered by Sector in Relation to Selected Risk Factors, by Nutrient



Deciding which Foods Can Meet Nutrient Shortfalls



Relationship between Dietary Intake and MN Status



Dietary intake ≠ Body stores

Types of Data Needed to Address Nutrition, by Sector

Sector	Type of Data	Data Sources
Agriculture	Farm inputs and crop production	Agriculture and economic surveys
Food industry	Food/nutrient availability	National food balance sheets; food composition tables
	Dietary intake	Dietary intake surveys; household consumption and expenditure surveys (HCES)
	Food prices	Market surveys; HCES
	Consumer choices	Consumer surveys; focus groups; depth interviews
	Industry capacity	Site visits, depth interviews
Health	Population nutritional status	Nutritional status and biomarker surveys
	Disease prevalence	Clinical surveillance; health surveys
Government	Policy reviews; landscaping of decision-makers	Desk reviews, depth interviews (“Target policy profile”)

Food System Policy and Program Options to Increase Nutrient Availability, Accessibility, and Intake

Objectives	Options
Increase year-round availability of nutrient-rich foods	↑ production, preservation, importation
Increase nutrient content of foods	Fortification, biofortification
Increase accessibility and safety of these foods	Price subsidies for agricultural inputs, improved transport & market facilities for perishable foods
Increase consumption of nutrient-rich foods	Behavior change communication, price subsidies, vouchers
Identify dietary shortfalls and deficiencies to be covered by targeted (health system) interventions	Supplementation, disease control as managed by health system

Conclusions

- The food system provides most nutrients, but agriculture and the food industry are not accountable for ensuring adequate dietary intake and nutritional status of populations
- The health system assesses population status, establishes norms, and implements limited programs to address nutrient shortfalls
- Better coordination of food and health systems is needed, supported by government policies
- Agricultural interventions should be informed by population nutritional needs
- Harmonization of sector-specific activities requires adequate data and reconsideration of sector-specific responsibilities and accountability
- More effort is needed to motivate policy makers and incentivize food producers to address nutrition

USAID
FROM THE AMERICAN PEOPLE

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Food and Agriculture Organization of the United Nations

New FAO Data Systems on Food and Nutrient Availability and Intake

Dr Bridget A Holmes
Food and Nutrition Division, FAO

20-October-2023

Dietary data is used to …

help us understand

- ✓ Food availability (supply)
- ✓ Food acquisition
- ✓ Food consumption—what and how much people eat, dietary diversity
- ✓ Differences by country, region, age, sex, income, type of area (rural / urban)
- ✓ Energy and nutrient intakes
- ✓ Sources of nutrients, risk of inadequacies and excesses

prioritise issues, monitor and improve

- ✓ Identify countries and population groups of concern
- ✓ Investigate links between diet and health
- ✓ Monitor high / low consumers of foods and investigate food safety risks
- ✓ Monitor dietary trends and shifts
- ✓ Track progress toward the Sustainable Development Goals
- ✓ Develop targeted evidence-based policies, guidelines, and programs

Whilst these data are critical, unfortunately they are …

… **scarce**, especially in low- and middle-income countries (LMICs)

… **expensive** to collect

… **scattered** in various locations

… **difficult to access**

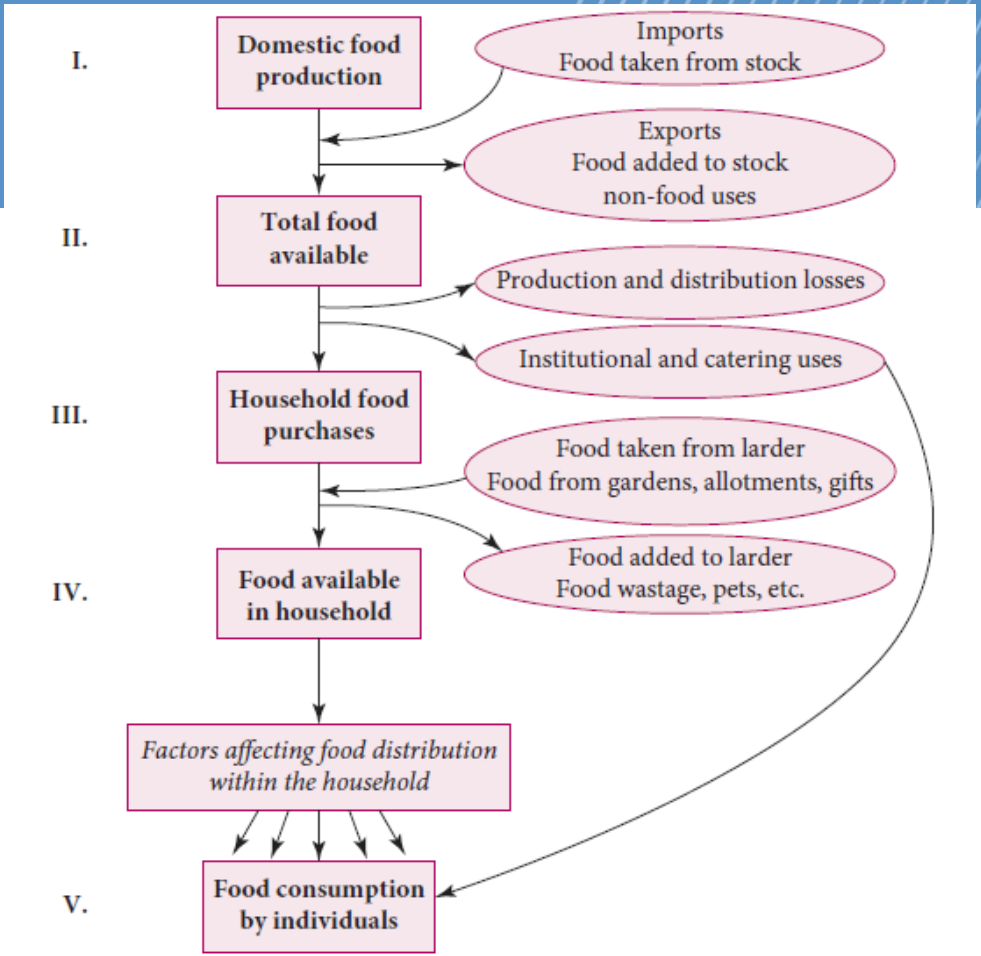
… **rarely harmonized**

… **inappropriately used, analysed and interpreted**

… not used to maximum potential!

Five stages in the food supply chain at which it is convenient to measure food availability or consumption—

from national through to household through to individual level

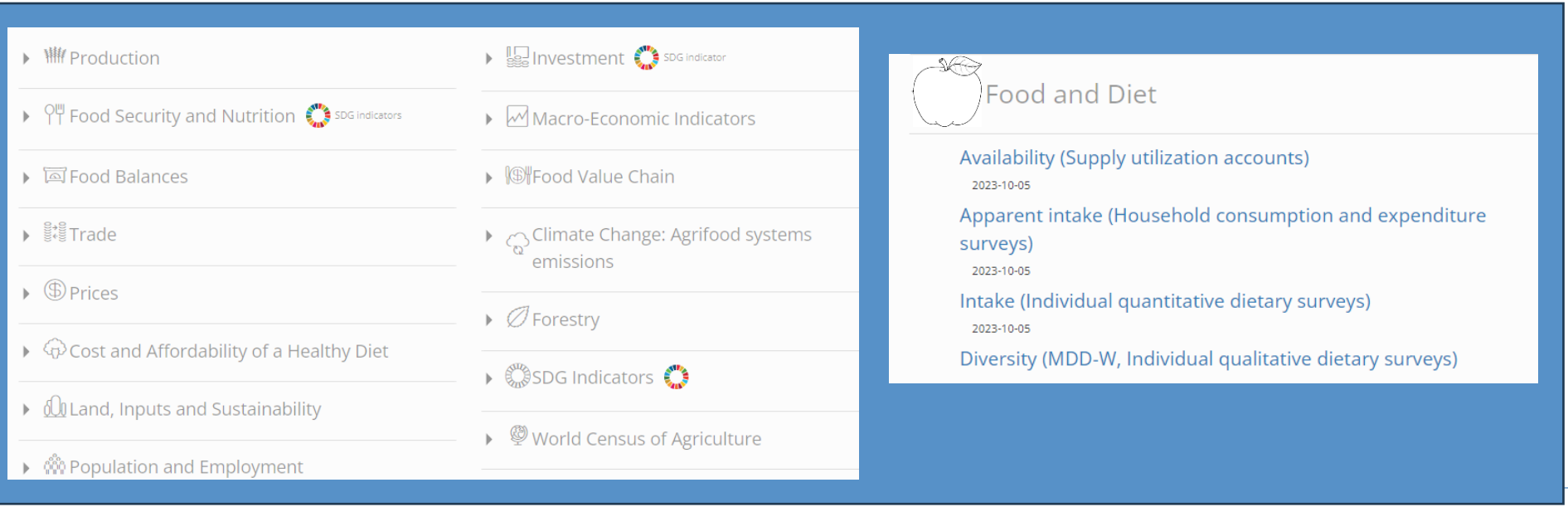


Source: Holmes B. 2023. "Dietary Assessment Methods." In: *Human Nutrition* 14th ed.

Food and Agriculture Organization of the United Nations

An integrated platform on FAOSTAT to disseminate statistics on all forms of diet-related data

FAOSTAT is the world's most comprehensive statistical database on food, agriculture, fisheries, forestry, natural resources management (and *coming soon* **food and diet**)



Food and Diet Domain: All forms of diet-related data …

AVAILABILITY

(FOOD BALANCE SHEETS / SUPPLY UTILIZATION ACCOUNTS)

APPARENT INTAKE

(HOUSEHOLD CONSUMPTION AND EXPENDITURE SURVEYS)

INTAKE

(INDIVIDUAL LEVEL SURVEYS)

DIVERSITY

(MDD-W—MINIMUM DIETARY DIVERSITY FOR WOMEN)

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AVAILABILITY

(FOOD BALANCE SHEETS /

SUPPLY UTILIZATION ACCOUNTS)

FAO Supply Utilization Accounts (SUA)

Until now data has only been available for energy, protein and fat

Objective: Update and extend the nutrients for analysis

- Match foods from SUA with food composition tables (FCTs)
- Systematic approach based on FAO/INFOODS standards, tools and guidelines
- Edible portion, energy, macro and micronutrients data for 530 items
- Using up-to-date national or regional FCTs representing all regions of the world

Country/Region	FCT/FCDB	Score	Available in English?	Available in Excel?
Asia				
Bangladesh	Food Composition Table for Bangladesh, 2013	110	Yes	Yes
China	China food composition, 2002	15	Yes	Yes
India	Indian Food Composition Database, 2017	90	No	Yes
Japan	The Standard Tables of Food Composition in Japan, 2015	110	Yes	Yes
Nepal	Nepalese Food Composition Table, 2017	25	Yes	No
Pakistan	Food Composition Table for Pakistan, 2001	70	Yes	No
Philippines	Philippine Food Composition Tables Online Database (PhilFCT®), 2020	70	Yes	No
Africa				
Burkina Faso	Table de Composition des Aliments Couramment Consommes au Burkina Faso	65	No	No
Ethiopia	Food Composition Table for use in Ethiopia (Parts III and IV), 1998	80	Yes	No
Kenya	Kenya Food Composition Tables, 2018	120	Yes	Yes
Malawi	Malawian Food Composition Table, 2019	85	Yes	No
Nigeria	Nigerian Food Composition Table, 2017	95	Yes	Yes
South Africa	Condensed Food Composition Tables for South Africa, 2010	60	Yes	Yes
Tanzania	Tanzania Food Composition Tables, 2008	75	Yes	Yes
Uganda	A Food Composition Table for Central and Eastern Uganda, 2012	105	Yes	Yes
Western Africa	FAO/INFOODS Food Composition Table for Western Africa (2019)	120	Yes	Yes
Latin America				
Argentina	Tabla de composición de alimentos, 2010	80	No	Yes
Bolivia	Tabla Boliviana de composición de alimentos, 2005	70	No	No
Brazil	Brazilian Food Composition Table (TACO), 2011	110	No	Yes
Colombia	Tabla de composición de alimentos Colombianos	70	No	No
Mexico	Tablas de composición de alimentos y productos alimenticios, 2015	75	No	No
Uruguay	Tabla de composición de alimentos de Uruguay, 2002	95	No	No
North America				
USA	USDA National Nutrient Database for Standard Reference (Legacy), 2019	115	Yes	Yes
Oceania				
Australia	The Australian Food Composition Database, 2019	120	Yes	Yes
New Zealand	New Zealand FOODfilesTM, 2018	120	Yes	Yes
Europe				
UK	McCance and Widdowson's The Composition of Foods Integrated Dataset (CoFID), 2019	100	Yes	Yes
Denmark	Frida, DTU Foods public food database, v. 4, 2019	100	Yes	Yes
Global tables				
Global	FAO/INFOODS Global food composition database for fish and shellfish (uFiSh1.0), 2016	115	Yes	Yes
Global	FAO/INFOODS Global food composition database for pulses (uPulses1.0), 2017	120	Yes	Yes

29 FCT/FCDB were assessed

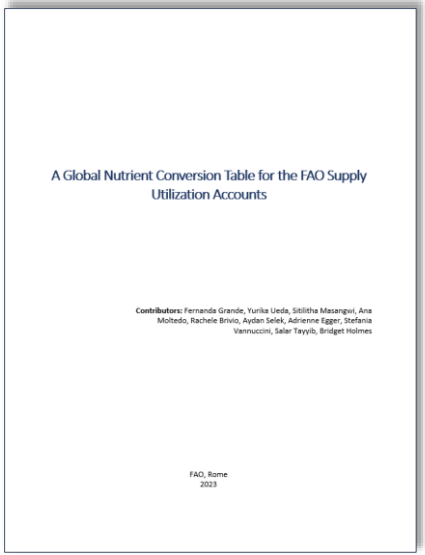
13 FCTs selected for use

Selection of components *based on data availability and quality*

	Component in English	INFOODS tagname	Unit	ASIA						AFRICA						USA		EUROPE		OCEANIA				GLOBAL				LATIN AMERICA	
				Japan, 2015		India, 2017		Bangladesh, 2013		FAO/INFOODS Western Africa, 2019		Kenya, 2018		Uganda, 2012		USDA Legacy, 2019		UK-McCance and Widdowson's, 2019		Australia, 2019		New Zealand, 2018		FAO/INFOODS Fish and Shellfish, 2016		FAO/INFOODS Pulses, 2017		Brazil (TACO), 2011	
				Included	Missing	Included	Missing	Included	Missing	Included	Missing	Included	Missing	Included	Missing	Included	Missing	Included	Missing	Included	Missing	Included	Missing	Included	Missing	Included	Missing	Included	Missing
	Number of food entries			**2191**		**528**		**381**		**1028**		**658**		**727**		**7793**		**2910**		**1534**		**2767**		**515**		**177**		**597**	
Edible portion	Edible portion 1	EDIBLE1	-	✓	0	-	*	✓	7%	✓	11%	✓	24%	-	*	-	*	✓	2%	✓	0	✓	0	✓	5%	-	*	-	*
	Density	DEN	g/ml	-	*	-	*	-	*	-	*	-	*	-	*	-	*	✓	98%	✓	0	✓	7%	-	*	-	*	-	*
Water	Water	WATER	g	✓	0	✓	0	✓	0	✓	0	✓	0	✓	0	✓	0	✓	0	✓	0	✓	0	✓	0	✓	0	✓	4%
Protein	Protein, total	PROTCNT	g	✓	0	✓	0	✓	0	✓	0	✓	0	✓	0	✓	0	✓	0	✓	0	✓	0	✓	0	✓	0	✓	5%
	Nitrogen, total	NT	g	-	*	-	*	-	-	-	*	-	*	-	*	-	*	✓	0	✓	59%	✓	0	-	*	✓	0	-	*
	Conversion factor for calculating total protein from total nitrogen	XN	-	✓	76%	✓	0	-	-	✓	10%	-	*	-	*	✓	80%	✓	58%	✓	0	✓	0	✓	0	✓	0	-	*
	Protein, total; method of determination unknown or variable	PROT-	g	-	*	-	*	-	-	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*
Fat	Fat, total	FAT	g	-	*	-	*	-	*	✓	0	✓	0	-	*	✓	0	✓	0	✓	0	✓	0	✓	0	-	*	-	*
	Fat, derived by analysis using continuous extraction	FATCE	g	-	*	✓	0	✓	0	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	✓	0	✓	6%
	Fat, total, method of determination unknown or mixed methods	FAT-	g	✓	0	-	*	-	*	-	*	-	*	✓	0	-	*	-	*	-	*	-	*	-	*	-	*	-	*
Carbohydrate	Carbohydrate, available; calculated by difference	CHOAVLDF	g	c	*	✓	41%	✓	0	✓	0	✓	0	c	*	c	*	-	*	c	*	✓	0	✓	0	✓	0	c	*
	Carbohydrate, total; calculated by difference	CHOCDF	g	✓	0	-	*	-	*	-	*	-	*	✓	0	✓	0	-	*	-	*	✓	0	-	*	-	*	✓	3%
	Carbohydrate, available; expressed in monosaccharide equivalents	CHOAVLM	g	✓	61%	-	*	-	*	-	*	-	*	-	*	-	*	✓	1%	-	*	✓	0	-	*	-	*	-	*
	Carbohydrate, available by weight	CHOAVL	g	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	✓	0	✓	0	-	*	-	*	-	*
	Carbohydrate, total; calculated by summation	CHOCSM	g	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	✓	0	-	*	-	*	-	*
	Carbohydrate; method of determination unknown or variable	CHO-	g	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*
Fibre	Fibre, total dietary	FIBTG	g	✓	6%	✓	41%	✓	1%	✓	0	✓	0	-	*	✓	7%	✓	48%	✓	0	✓	0	✓	0	✓	0	✓	41%
	Fibre, crude	FIBC	g	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*
	Fibre; determined by neutral detergent method	FIBND	g	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*	-	*
	Polysaccharides, non-starch (Englyst method)	NSP	g	-	*	-	*	-	*	-	*	-	*	-	*	-	*	✓	12%	-	*	-	*	-	*	-	*	-	*
	Fibre; method of determination unknown or mixed methods	FIB-	g	-	*	-	*	-	*	-	*	-	*	✓	0	-	*	-	*	-	*	-	*	-	*	-	*	-	*
Alcohol	Alcohol	ALC	g	✓	0	n.a.	*	n.a.	*	✓	0	n.a.	*	-	*	✓	31%	✓	34%	✓	0	✓	0	n.a.	*	n.a.	*	✓	*

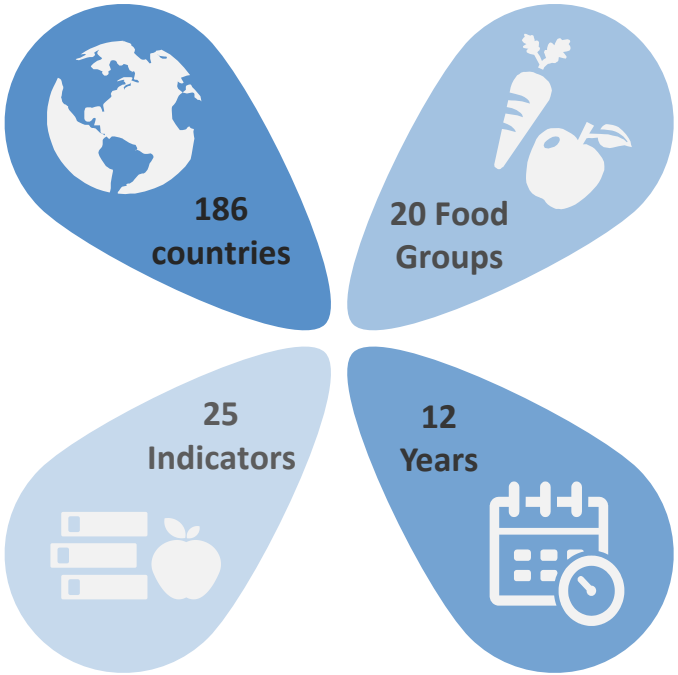
Outputs: user database and documentation

CPC_Code	CPC_Description	Edible	Quality	Energy	Water	Protein, total	Total fat	CHO avl. diff.	Dietary fiber	Alcohol	Ash	Calcium	Iron	Magnesium
0111	wheat	1.00	A2	334	11.7	11.8	2.2	60.5	12.2	0	1.6	32	4.0	112
23110	wheat and meslin flour	1.00	A2	345	12.5	10.9	1.6	69.3	4.9	0	0.8	23	2.0	49
39120.01	bran of wheat	1.00	A	281	9.3	15.6	4.7	23.2	41.7	0	5.5	73	13.2	525
23710	uncooked pasta, not stuffed	1.00	A2	351	10.6	11.9	1.8	69.8	3.8	0	2.0	23	1.5	47
23140.01	germ of wheat	1.00	A	379	7.4	27.6	10.7	36.3	13.8	0	4.4	41	7.8	275
F0020	bread	1.00	A2	273	32.5	9.2	3.4	49.8	3.3	0	1.8	59	1.7	31
23140.02	bulgur	1.00	A2	344	9.5	11.3	1.6	65.9	10.4	0	1.3	32	2.7	116
F0022	pastry	1.00	A2	392	18.3	6.5	14.8	57.5	1.6	0	1.4	59	1.4	16
23220.01	starch of wheat	1.00	A	349	13.1	0.2	0.5	86.0	0.0	0	0.2	14	0.6	5
23220.02	wheat gluten	1.00	A2	209	50.1	40.1	2.7	6.0	0.5	0	0.7	62	3.3	32
24230.01	wheat-fermented beverages	1.00	C2	39	92.8	0.4	0.0	3.1	0.0	3.6	0.1	4	0.0	7
0113	rice	0.77	A2	348	12.2	7.7	2.0	72.9	4.0	0	1.2	22	1.6	105
23162	husked rice	1.00	A2	351	12.3	7.9	2.5	72.4	3.8	0	1.2	16	1.4	110
23161.01	rice, milled (husked)	1.00	A2	349	12.5	7.1	0.9	77.4	1.6	0	0.6	19	0.9	31
23161.02	rice, milled	1.00	A2	349	12.5	7.1	0.9	77.4	1.6	0	0.6	19	0.9	31
23161.03	rice, broken	1.00	A2	348	12.8	7.0	0.9	77.3	1.4	0	0.5	11	0.9	31
23220.03	starch of rice	1.00	B	355	11.1	0.4	0.2	87.5	0.6	0	0.3	7	0.5	4
39120.02	bran of rice	1.00	A	393	7.5	13.4	20.4	28.5	20.8	0	9.3	50	14.9	875
21691.01	oil of rice bran	1.00	A	900	0.0	0.0	100.0	0.0	0.0	0	0	0	0.0	0
23120.01	flour of rice	1.00	A2	352	12.2	6.2	1.3	77.8	1.9	0	0.6	9	0.8	37
24230.02	rice-fermented beverages	1.00	A2	110	82.4	0.4	0.0	4.2	0.0	13.0	0	3	0.0	2
23140.03	breakfast cereals	1.00	A2	368	5.0	9.7	2.5	71.9	9.4	0	1.6	30	2.8	100
0115	barley	0.86	A	329	10.7	10.9	1.9	59.4	15.4	0	1.7	33	5.1	109
23140.04	pot barley	1.00	A	329	10.7	10.9	1.9	59.4	15.4	0	1.7	33	5.1	109
23140.05	barley, pearled	1.00	A	330	10.3	8.9	1.4	62.7	15.6	0	1.1	25	2.8	72
39120.03	bran of barley	1.00	C	281	9.3	15.6	4.7	23.2	41.7	0	5.5	73	13.2	525
23120.02	barley flour and grits	1.00	A	336	13.1	9.9	2.3	64.6	8.9	0	1.4	28	3.6	93
24320	malt, whether or not roasted	1.00	B	357	8.2	10.3	1.8	71.2	7.1	0	1.4	37	4.7	97
23999.01	malt extract	1.00	B	310	21.1	6.2	0.0	71.4	0.0	0	1.3	61	1.0	72
24310.01	beer of barley, malted	1.00	A2	44	92.1	0.4	0.0	3.2	0.0	4.2	0.1	5	0.0	8



Supply Utilization Accounts (SUAs): overview

Global coverage
(with some minor exceptions according to the United Nations M-49 list)



All SUA Items
All items grouped to an adapted version of the FAO/WHO GIFT food grouping

Energy and selected nutrients
The statistics for energy and 14 + 9 fish-specific macro and micronutrients have been produced

From 2010 to 2021
All the available data compiled with the new SUA/FBS methodology has been used

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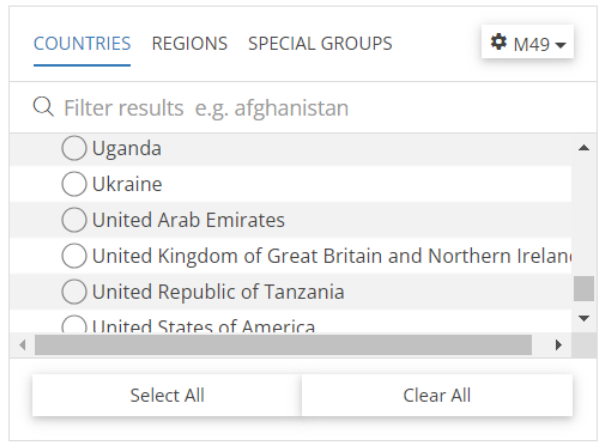
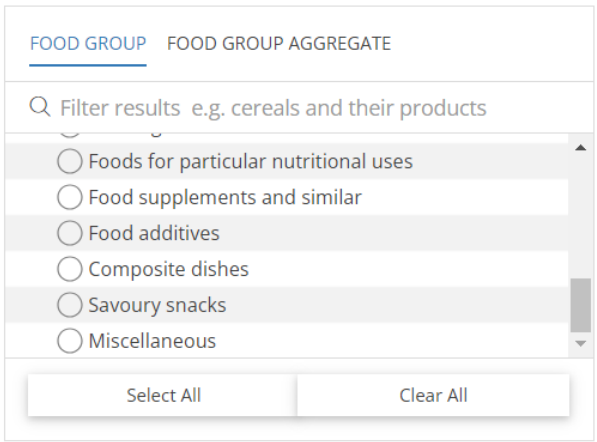
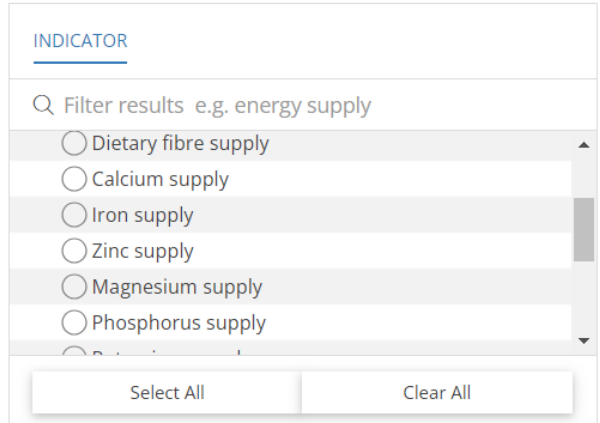
DOWNLOAD, VISUALIZE, and SHOW METADATA

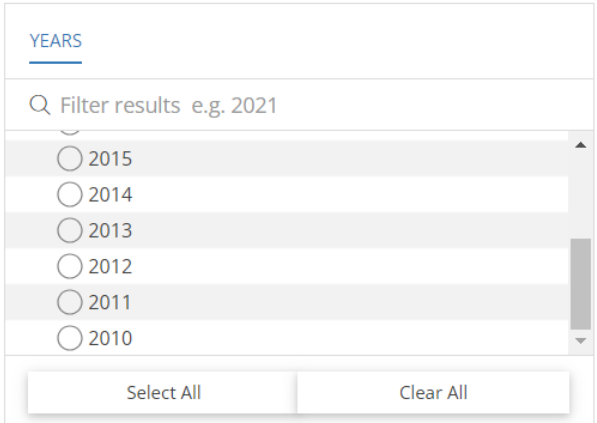
Availability (Supply utilization accounts)

DOWNLOAD DATA | VISUALIZE DATA | METADATA

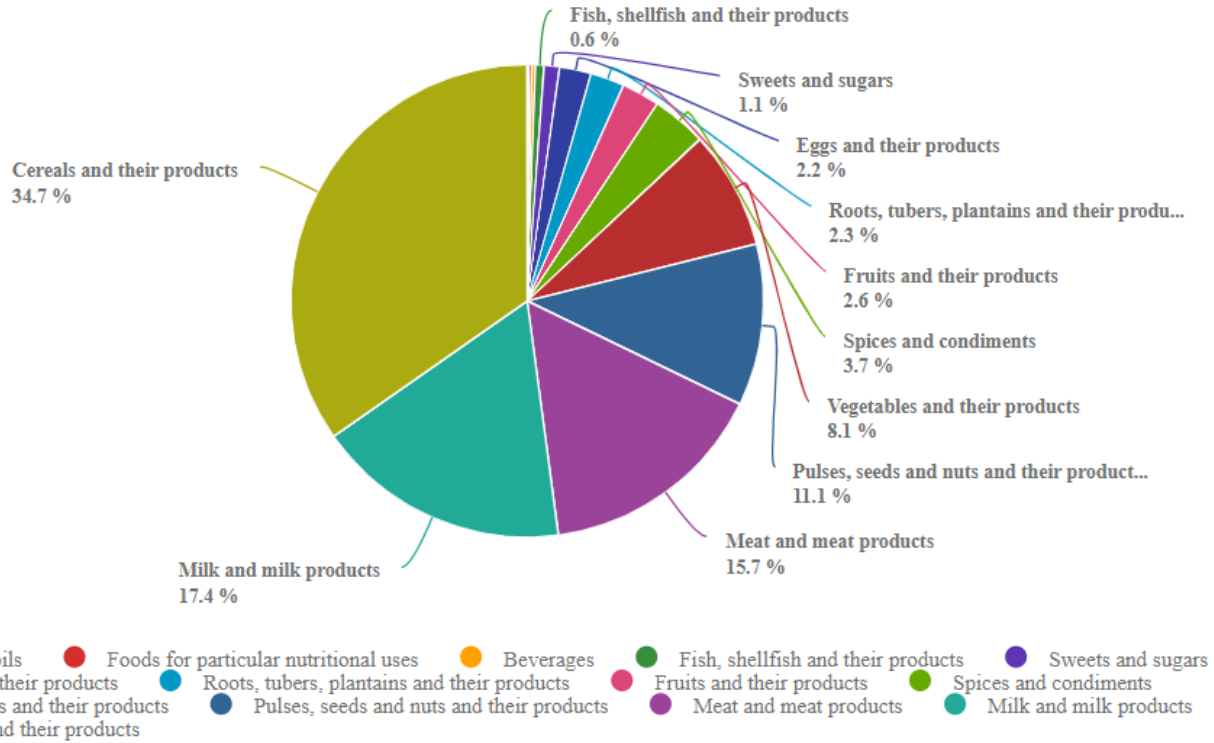




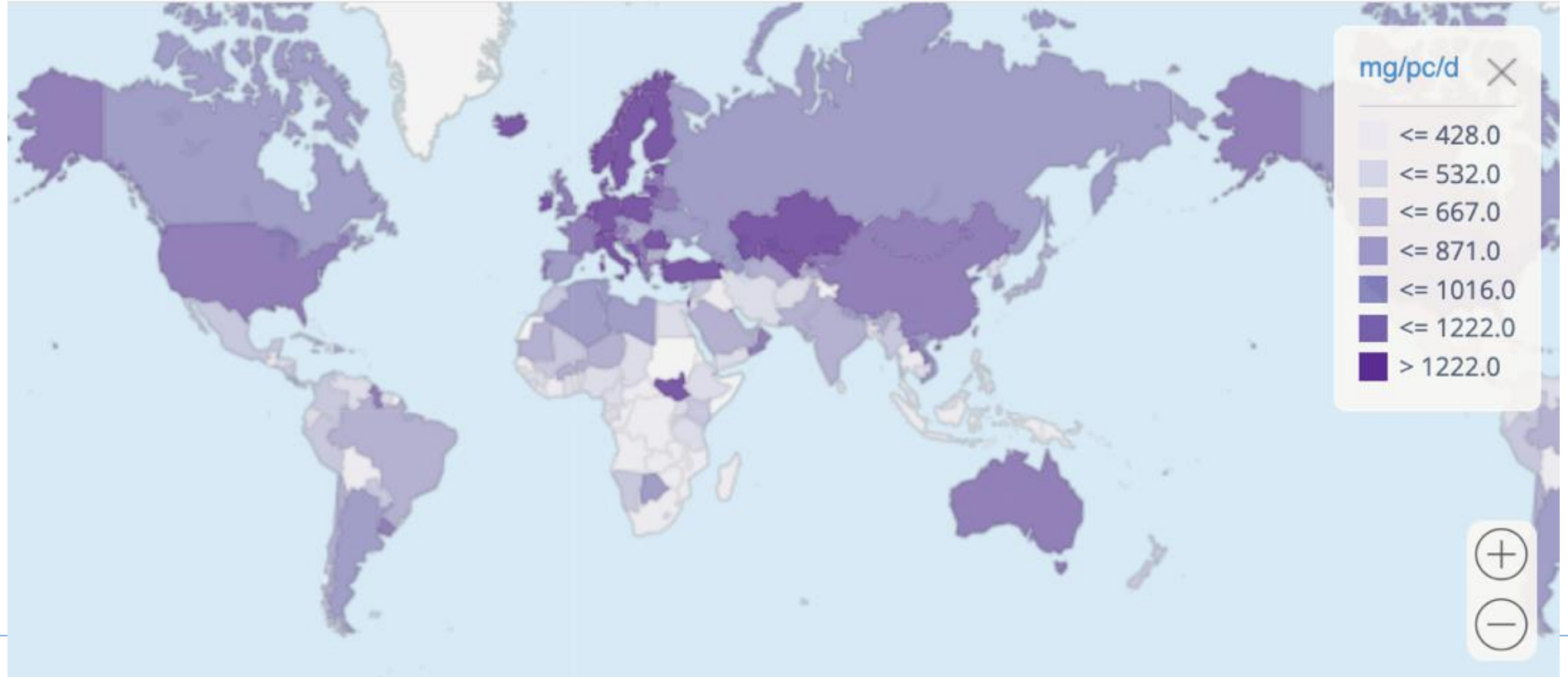




Example visual—Zinc supply by food group (Türkiye, 2021)



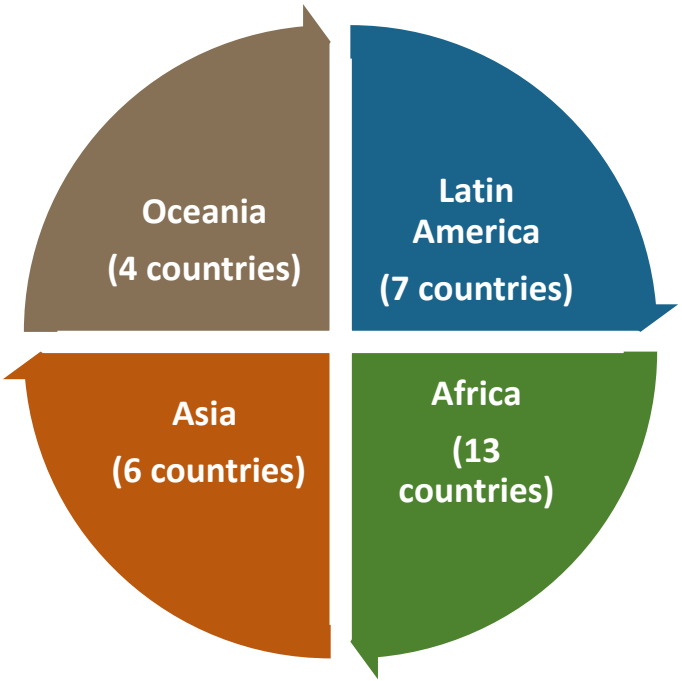
Example visual—Calcium supply by country (2021)



APPARENT INTAKE

(HOUSEHOLD CONSUMPTION AND EXPENDITURE SURVEYS)

Household Consumption and Expenditure Surveys (HCES)

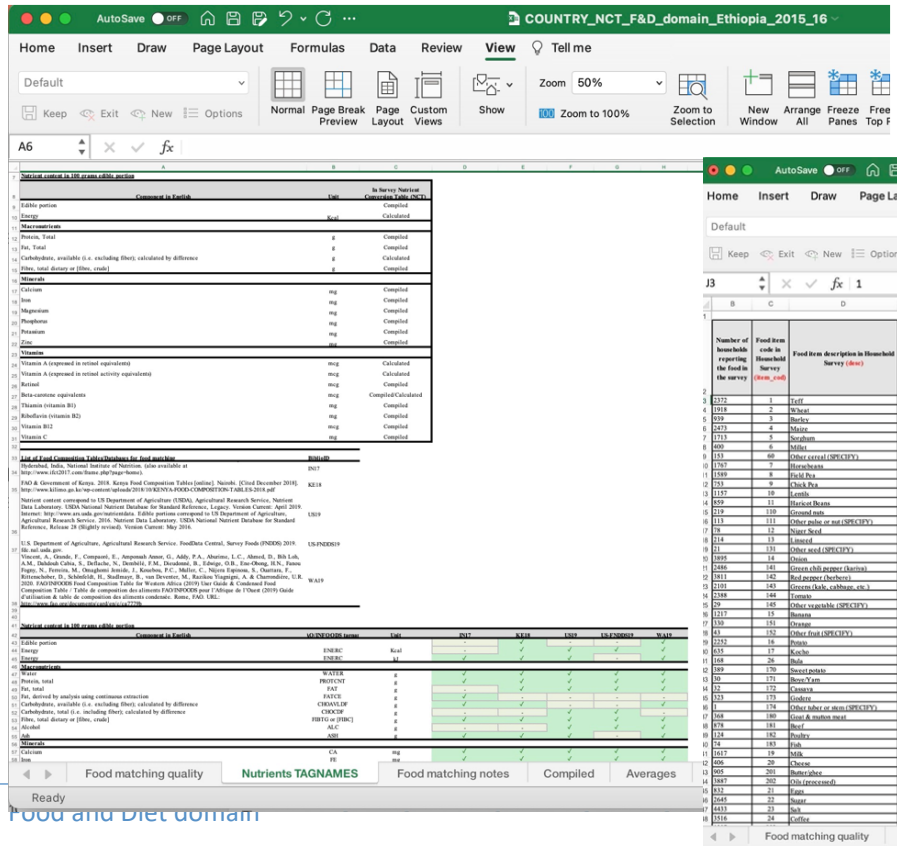


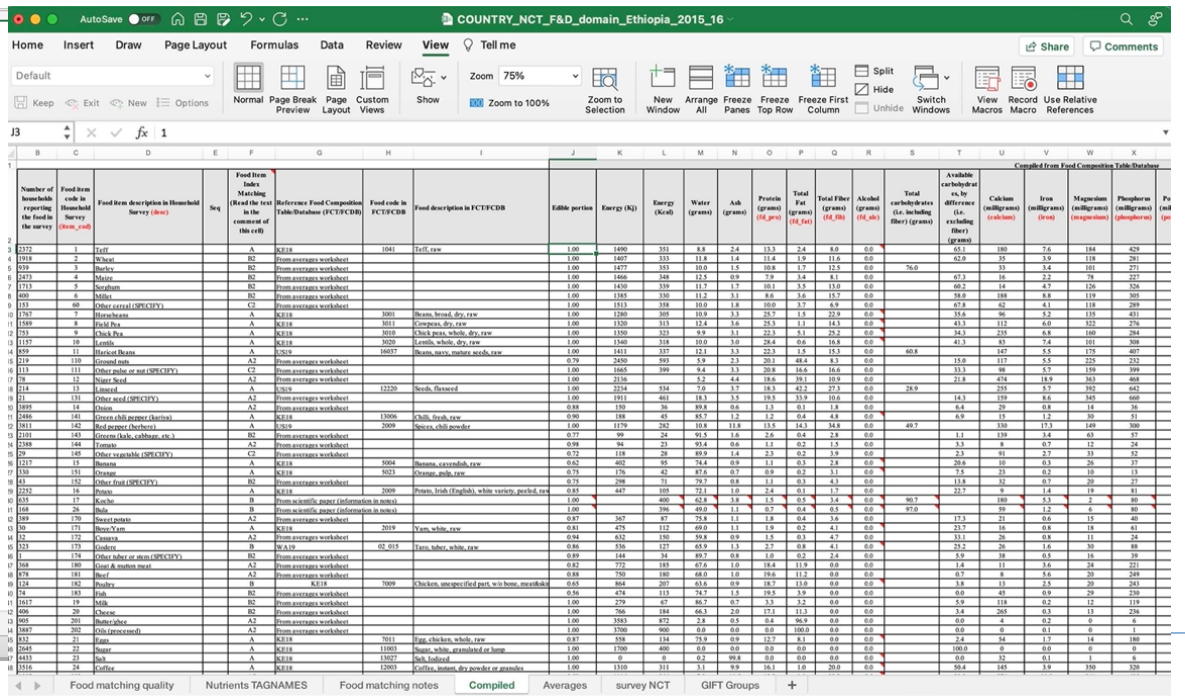
Until now processing of HCES has not been standardised and no centralised location existed for sharing statistics

- NOW 38 HCES from 30 countries[1]
- All with well-documented survey specific nutrient conversion tables
- Matching of foods based on systematic approach following FAO/INFOODS standards, tools and guidelines
- Using up-to-date national or regional FCTs

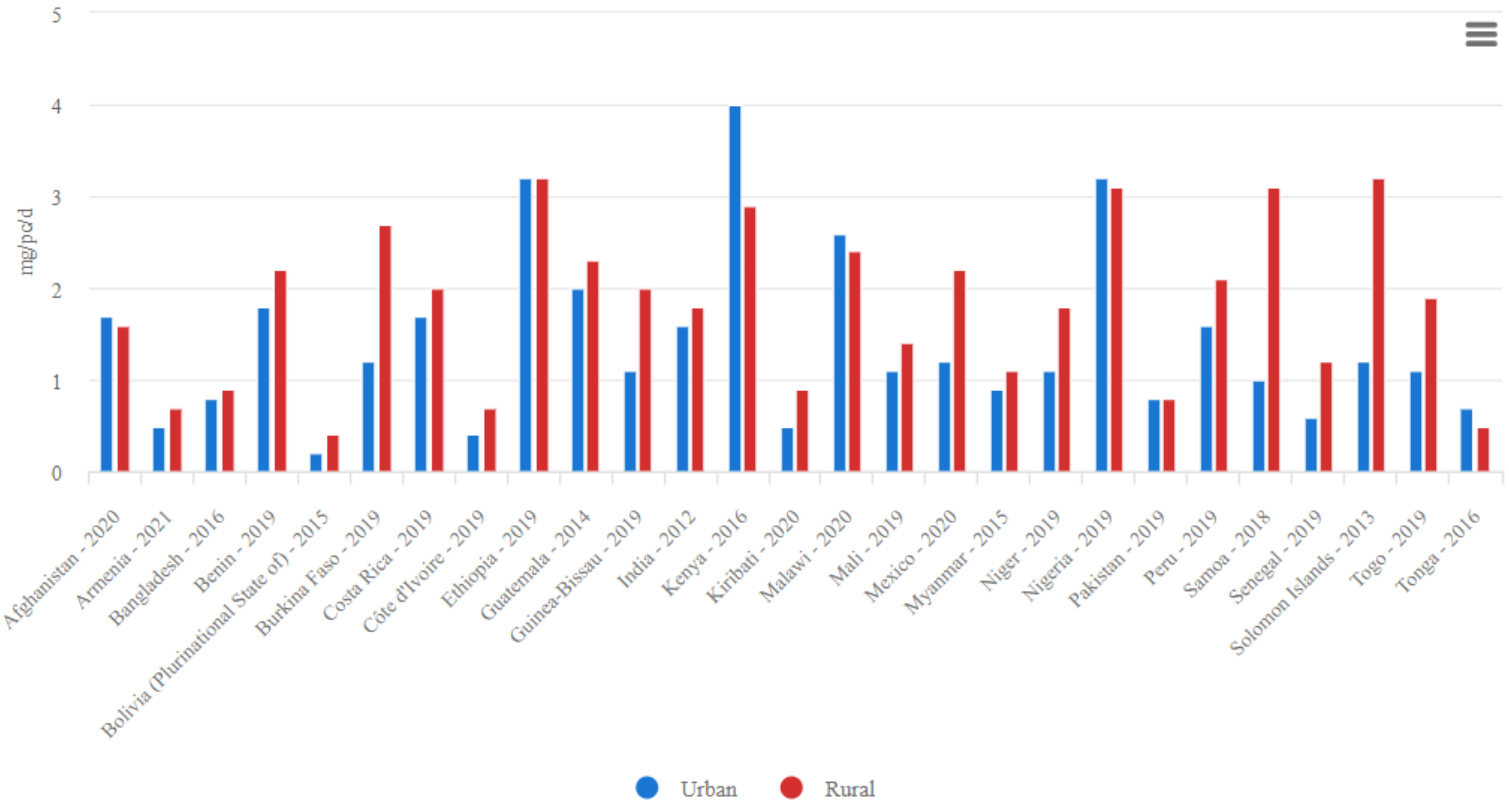
1. 17 HCES were excluded (e.g., food list, lack of conversion factors to estimate grams, unreliable results, no permission to upload the statistics)

HCES Nutrient Conversion Tables

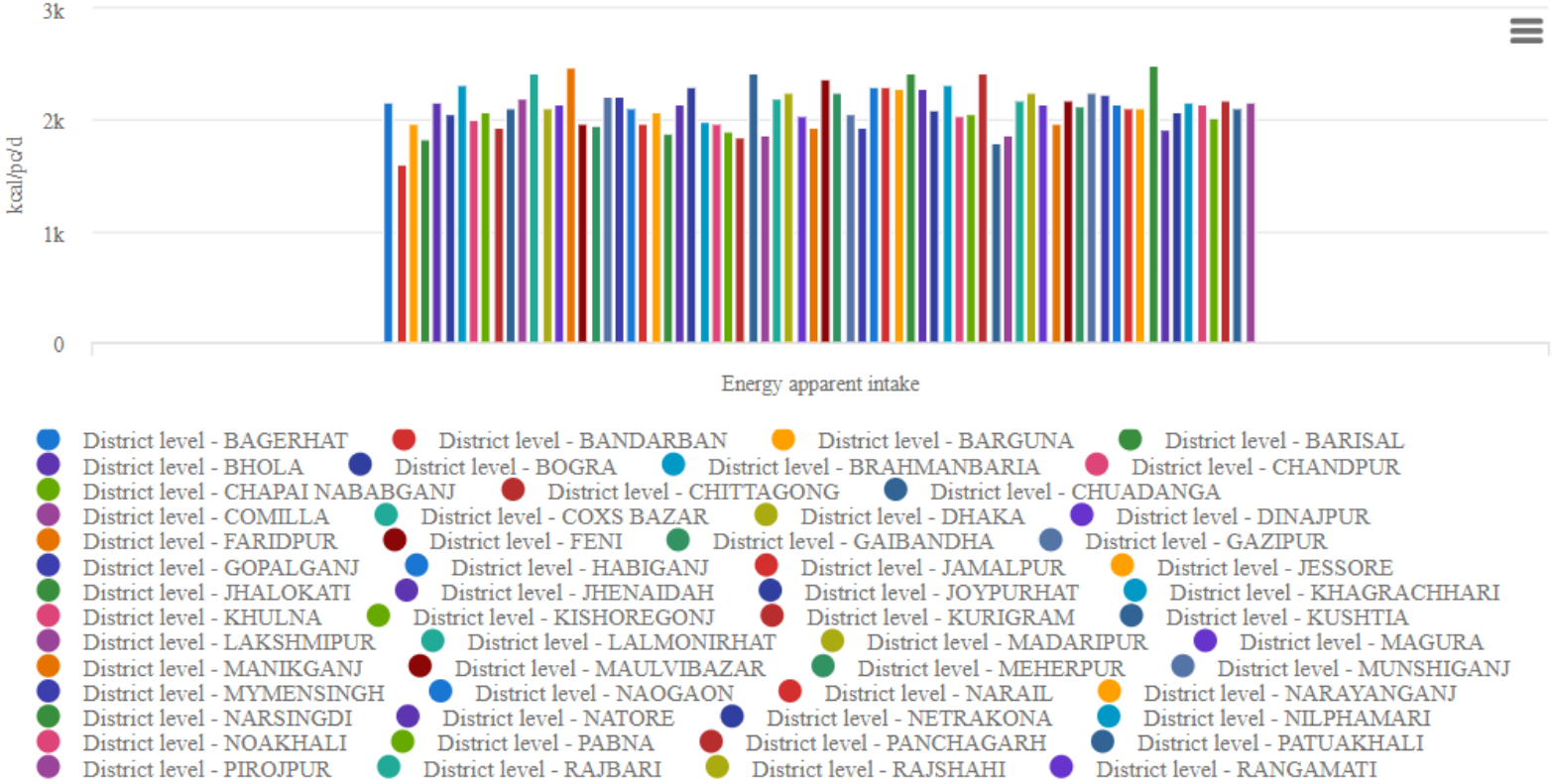




Example visual—HCES—Iron apparent intake from pulses, seeds and nuts, by area



Example visual—HCES—Energy apparent intake, all food groups, Bangladesh (2016), by district



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INTAKE

(INDIVIDUAL LEVEL SURVEYS)

DIVERSITY

(MDD-W—MINIMUM DIETARY DIVERSITY FOR WOMEN)

Intake & Diversity—Individual level

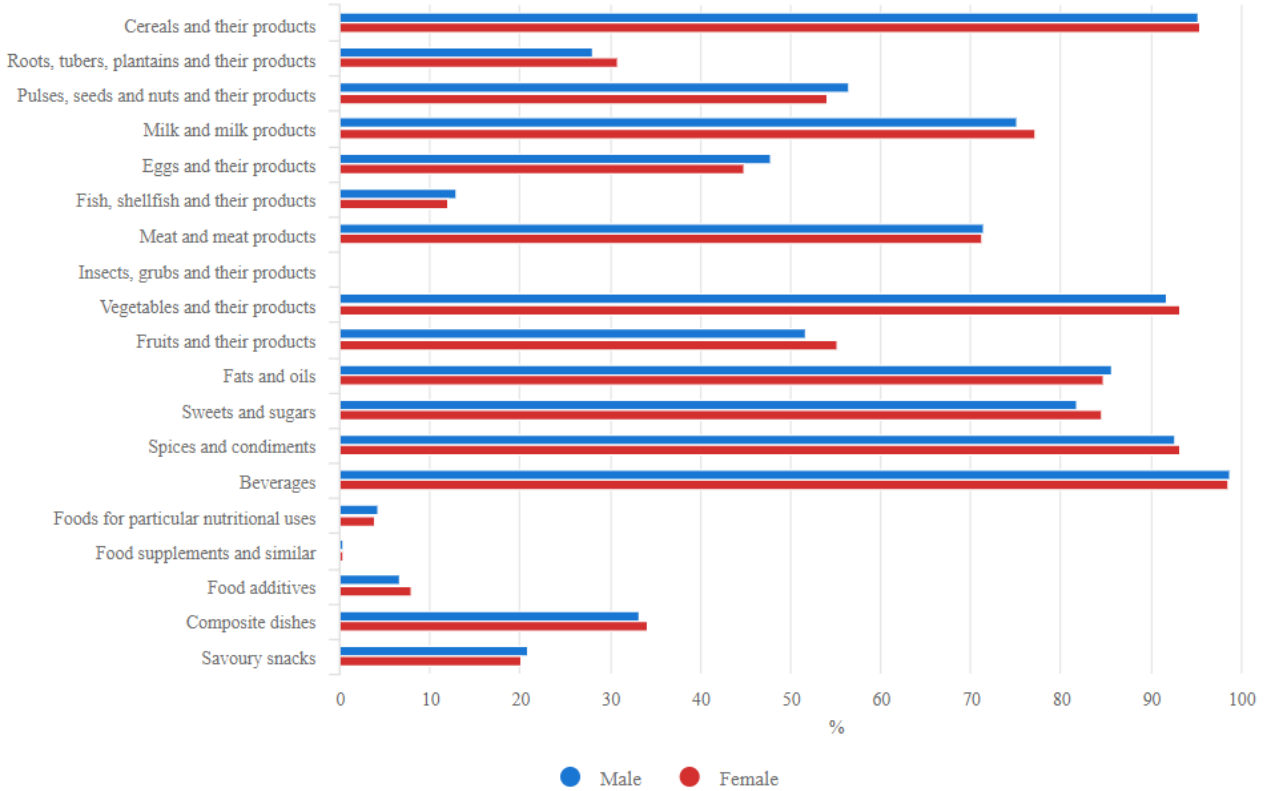
Intake

- Individual level statistics are from FAO/WHO GIFT datasets representative at national level with sampling weights
- Statistics from 3 surveys (Brazil 2014, Mexico 2012, Tunisia 1996–1997)
- Complementary visuals to those available on FAO/WHO GIFT

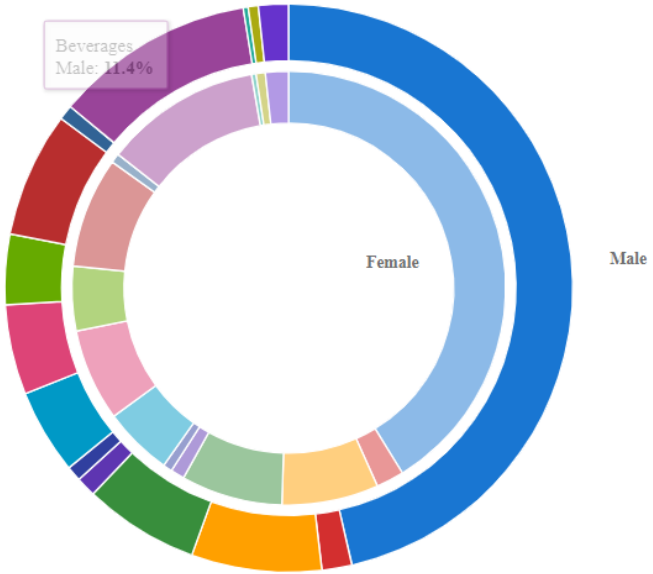
Diversity

- MDD-W statistics from 10 surveys, from 9 countries between 1996 and 2022
- Multiple data sources (DHS, World Bank and calculated from FAO/WHO GIFT)

Example visual—Individual level intake—percentage of consumers by sex, Mexico, 2012

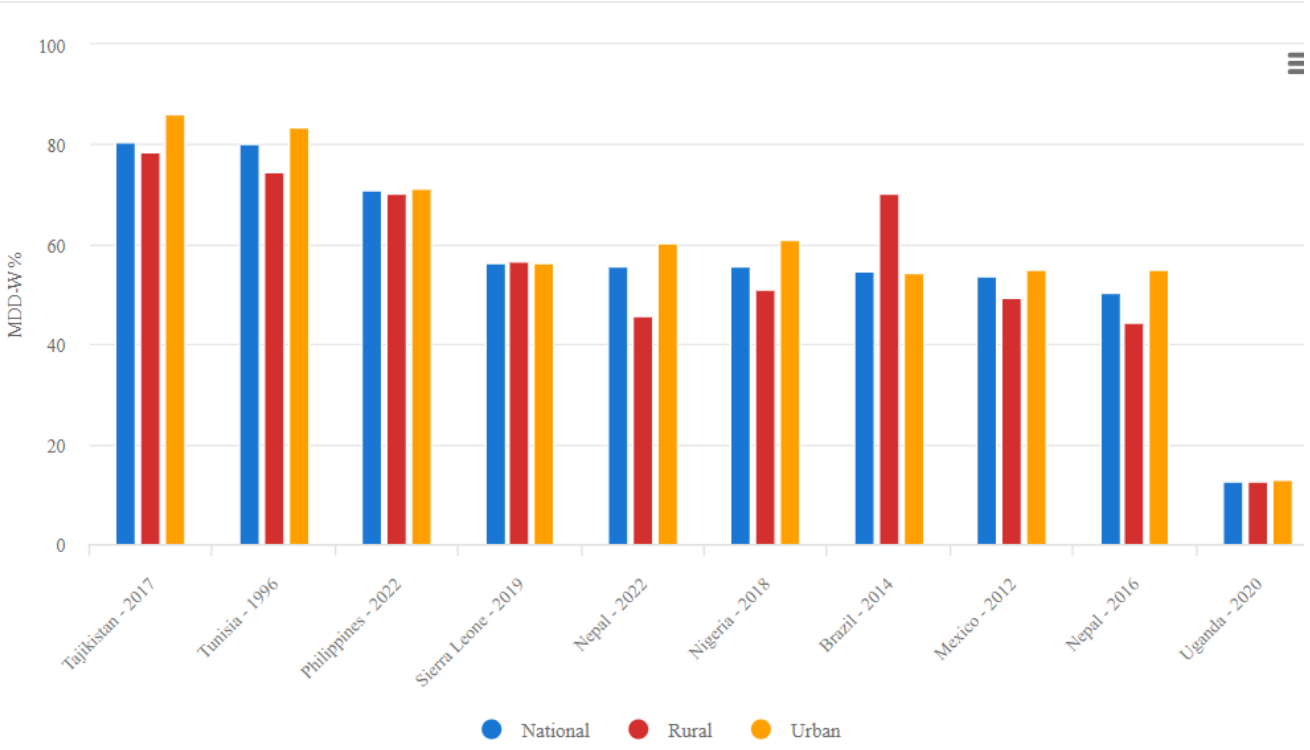


Example visual—Individual level intake—contribution of food groups to Magnesium intake, Mexico, 2012

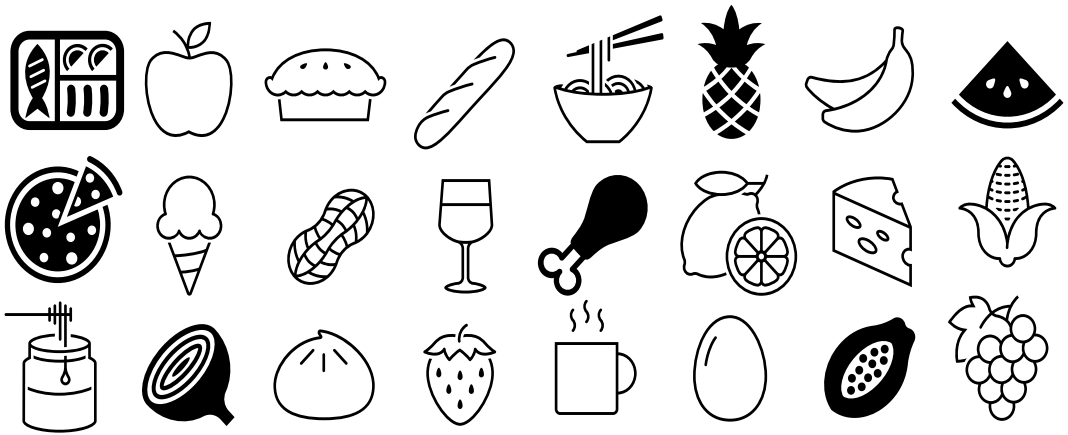


Cereals and their products
Roots, tubers, plantains and their products
Pulses, seeds and nuts and their products
Milk and milk products
Eggs and their products
Fish, shellfish and their products
Meat and meat products
Vegetables and their products
Fruits and their products
Sweets and sugars
Spices and condiments
Beverages
Foods for particular nutritional uses
Composite dishes
Savoury snacks

Example visual—Diversity—percentage of women achieving MDD-W, by survey and area



Food and Diet Domain: Harmonised nutrition sensitive food grouping



Statistics for *all data types* displayed using nutrition-sensitive FAO/WHO GIFT food groups

Food and Diet Domain: Nutrient list

1. Energy [kcal/100g EP]
2. Protein [g/100g EP]
3. Fat [g/100g EP]
4. Carbohydrate, available [g/100g EP]
5. Dietary fiber [g/100g EP]
6. Total saturated fatty acids [g/100g EP] (fisheries only)
7. Total monounsaturated fatty acids [g/100g EP] (fisheries only)
8. Total polyunsaturated fatty acids [g/100g EP] (fisheries only)
9. Docosahexaenoic acid n-3 (DHA) [g/100g EP] (fisheries only)
10. Eicosapentaenoic acid n-3 (EPA) [g/100g EP] (fisheries only)
11. Calcium [mg/100g EP]
12. Iron [mg/100g EP]
13. Magnesium [mg/100g EP]
14. Phosphorus [mg/100g EP]
15. Potassium [mg/100g EP]
16. Zinc [mg/100g EP]
17. Copper [mg/100g EP] (fisheries only)
18. Selenium [mcg/100g EP] (fisheries only)
19. Vitamin A [mcg RE/100g EP]
20. Vitamin A [mcg RAE/100g EP]
21. Thiamin [mg/100g EP]
22. Riboflavin [mg/100g EP]
23. Vitamin C [mg/100g EP]
24. Vitamin B6 [mg/100g EP] (individual level, HCES and fisheries only)
25. Vitamin B12 [mg/100g EP] (individual level, HCES and fisheries only)

THE FOOD AND DIET DOMAIN WILL …

… Be the **first centralized location** for sharing of statistics on all forms of dietary related data

… Provide for the first time **micronutrient statistics from FAO food availability data**

… Provide for the first time **numerous processed HCES data**

… Help to **harmonize processing and presentation** of food and diet data through a nutrition-sensitive food grouping

… **Increase dissemination** of information on food and diet and help to fill gaps

… **Improve utilization** of statistics and indicators on food and diet through clear and transparent documentation and capacity development

… Be **continually updated and extended** with more statistics, more countries, and more indicators

… Be released in November 2023!

Food and Agriculture Organization of the United Nations

Acknowledgements

Project team: Ana Moltedo, Aydan Selek, Fernanda Grande, Juan Pablo Parraguez, Pauline Allemand, Adrienne Egger, Salar Tayyib, Carlo Cafiero, Bridget Holmes

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- Giles Hanley-Cook & Isabela Sattamini (Individual level data, MDD-W)
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In loving memory of Salar Tayyib

Team Leader, Crops, Livestock and Food Statistics,

Statistics Division, FAO

Thank you

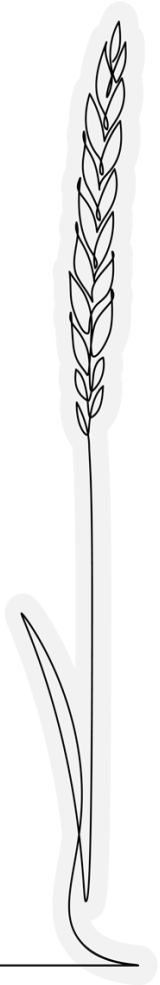
bridget.holmes@fao.org

Complementary Food Systems Interventions, including Food Fortification

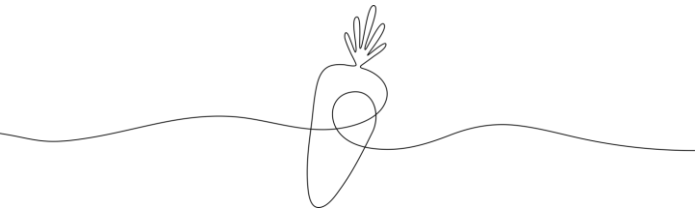
Mduduzi N.N. Mbuya, PhD
The Global Alliance for Improved Nutrition (GAIN)
Micronutrient Forum, October 2023

Outline

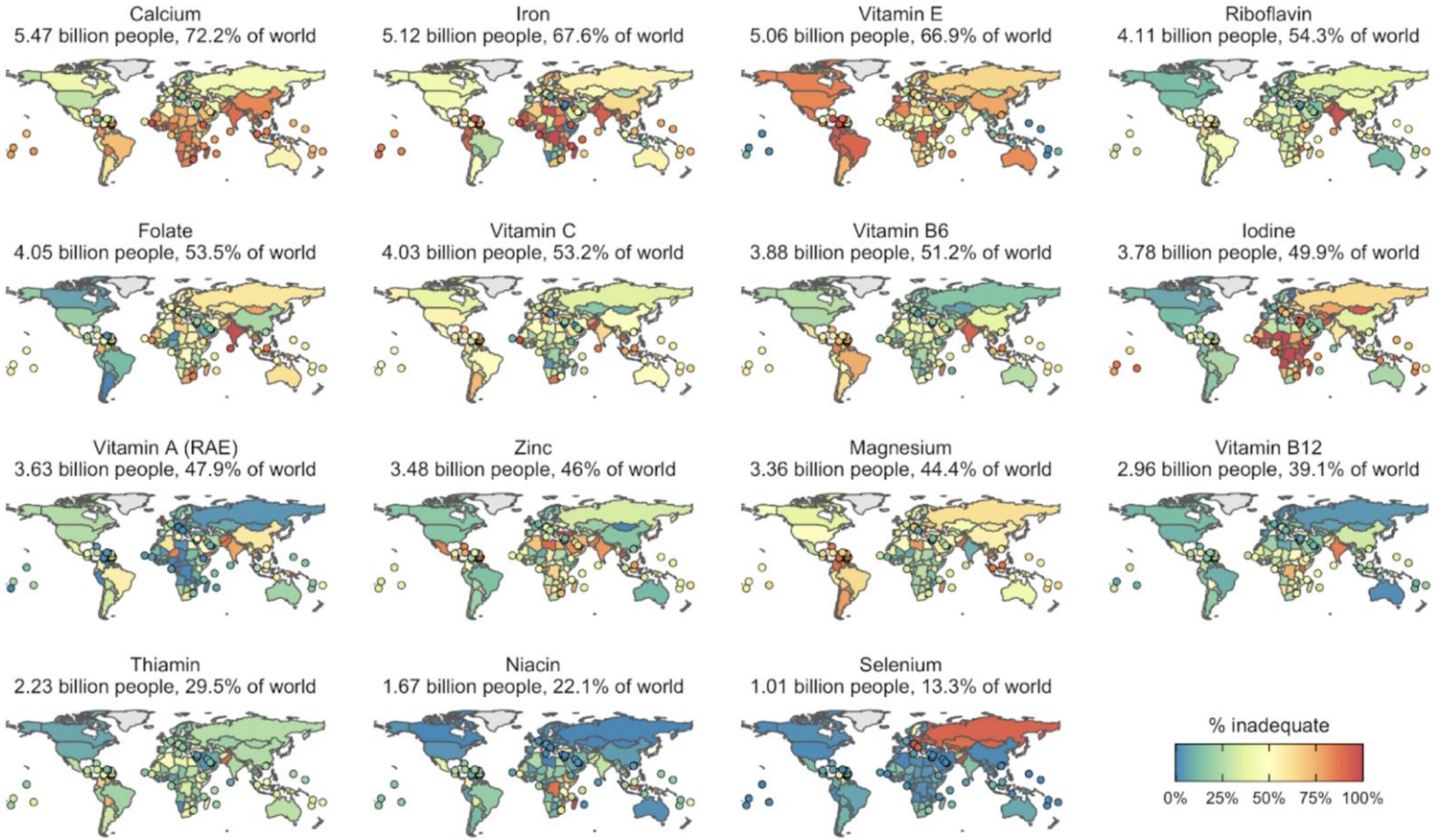
1. Dietary inadequacies in vitamins and minerals are widespread
2. Proven interventions can improve micronutrient adequacy
3. Food systems can be transformed to be more nutritious
4. Concluding thoughts



1. Dietary Inadequacies in Vitamins and Minerals are Widespread Globally

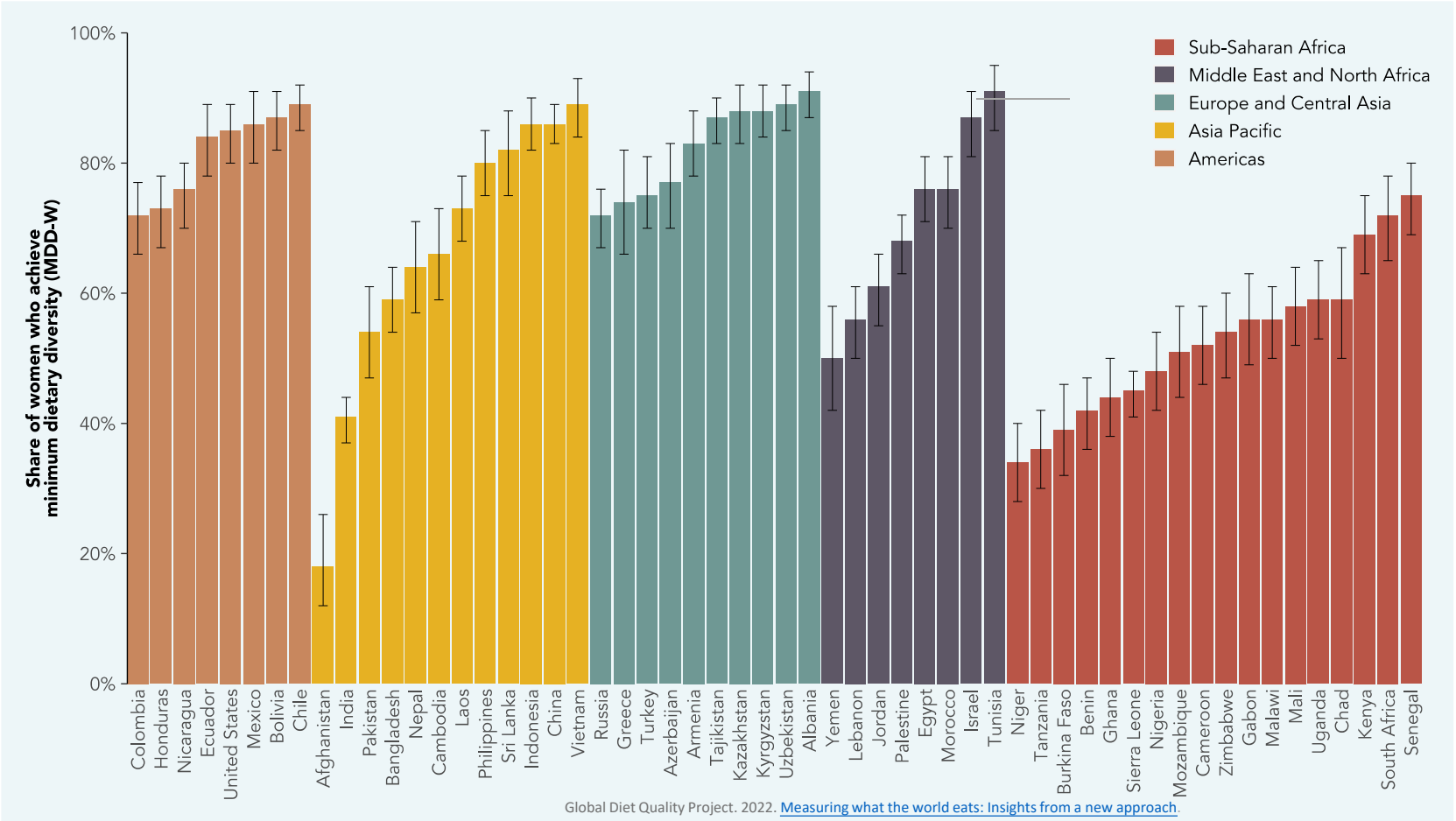


Dietary Inadequacies in Vitamins and Minerals are Widespread Globally



Passarelli et al. n.d. "Dietary Micronutrient Inadequacies Worldwide." forthcoming.

Minimum Dietary Diversity is Low in Africa and South Asia



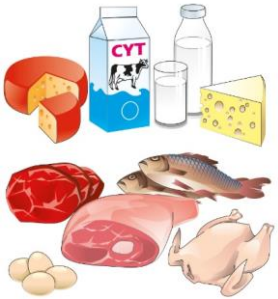
Global Diet Quality Project. 2022. Measuring what the world eats: Insights from a new approach.

2. Proven Interventions Can Address Micronutrient Adequacy

- Dietary change
- Fortification
- Biofortification
- Supplementation

Beal (2023). *Can we modify EAT-Lancet's 'planetary health diet' to be nutritionally adequate and environmentally friendly?* AgFunder News.

#1 DIETARY CHANGE



Increase the good:

- Diet diversification
- Global and national dietary guidelines, to **improve nutrient adequacy**, but…

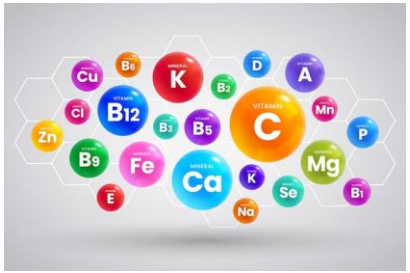
Curb the "bad"

- Address food safety risk
- Reduce foods that pose **noncommunicable risk (NCD) risk**, but…

- Seasonal variations in food availability
- Vulnerability, purchasing power constraints
- Fragile food systems and food systems infrastructure

- Greater marketing, desirability, convenience of UPF

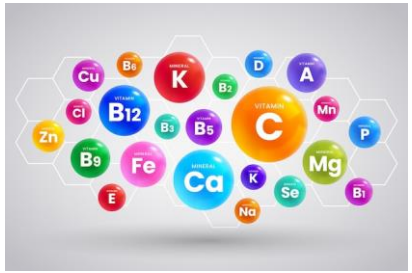
#2 FORTIFICATION



- Effective in improving micronutrient adequacy
- Relatively affordable, acceptable
- Low environmental impacts
- In theory, it can address a significant proportion of the micronutrient inadequacy, but…

- Different subgroups have **different requirements** and consume **different quantities** of each food
- **Excessive amounts** of certain micronutrients can be problematic
- **Lack of compliance** to fortification standards

#3 BIOFORTIFICATION



- Harvested foods have **increased intrinsic nutrient density**
- The nutrients are bound together in a **food matrix** and available in unprocessed foods
- **No challenges** with suboptimal implementation of food **fortification standards**, but…

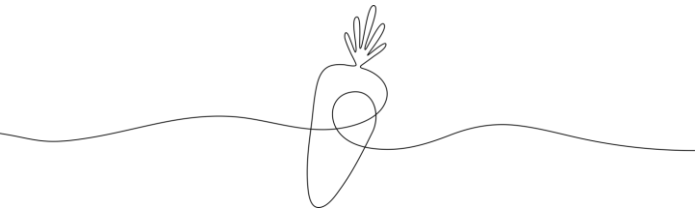
- **Mainstreaming biofortification** into breeding programs and scaling up biofortified varieties in the private and public sectors to **reach a large share of the global population** is under-tested.

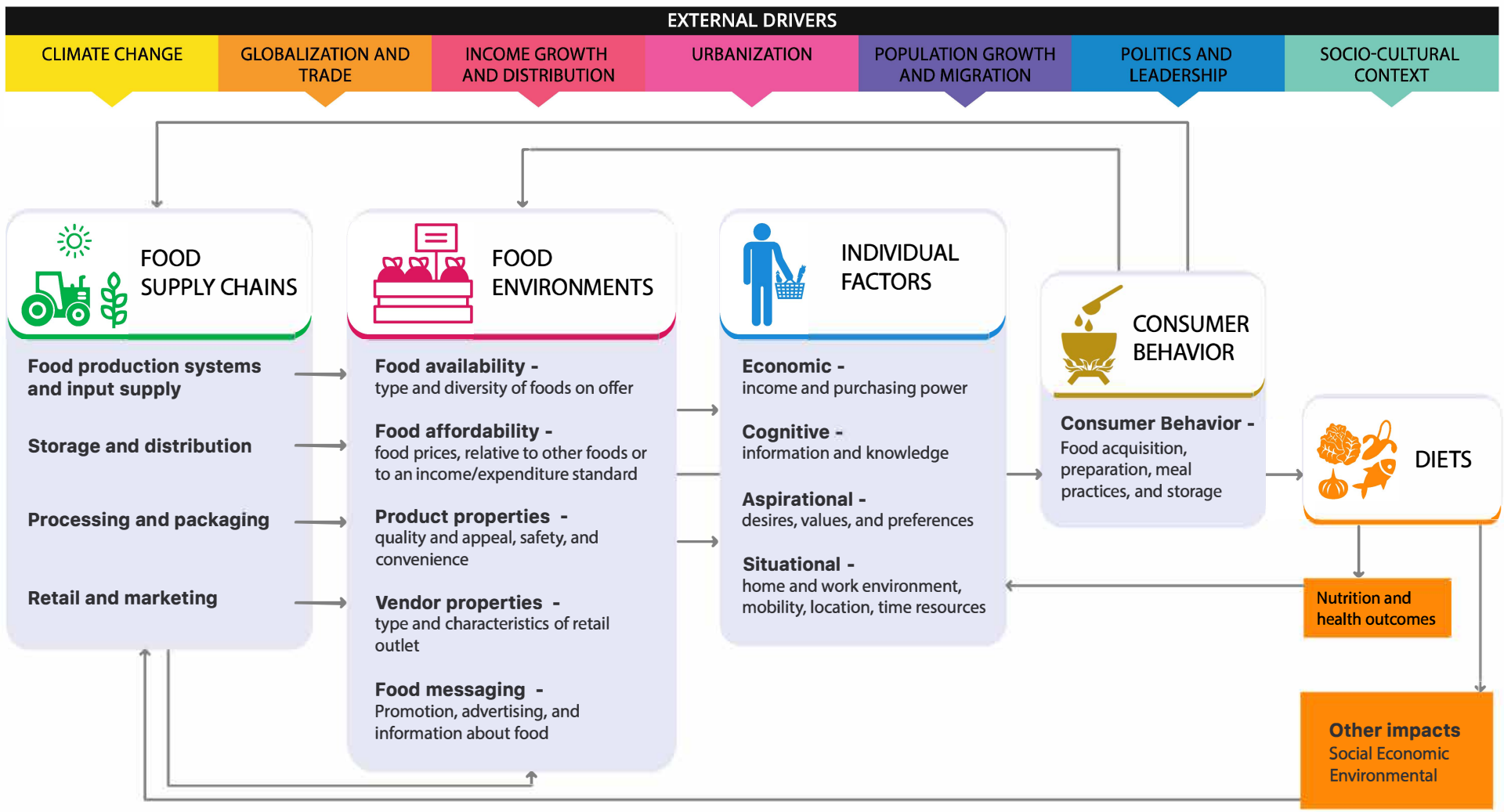
#4 SUPPLEMENTATION

- Can be an effective strategy to **improve micronutrient adequacy** globally
- Can be relatively **affordable**
- Can be **sustainable**, but…

- **It depends** on the supplement, the nutrition status of the individual who consumes them, and disease/infection context
- Potential **side effects can** constrain adherence
- Challenges with **accessibility and compliance** to standards
- **Does not fully replicate** the health effects of obtaining nutrients from **intrinsically nutrient dense foods**

3. Food Systems Can be Transformed to Be More Nutritious



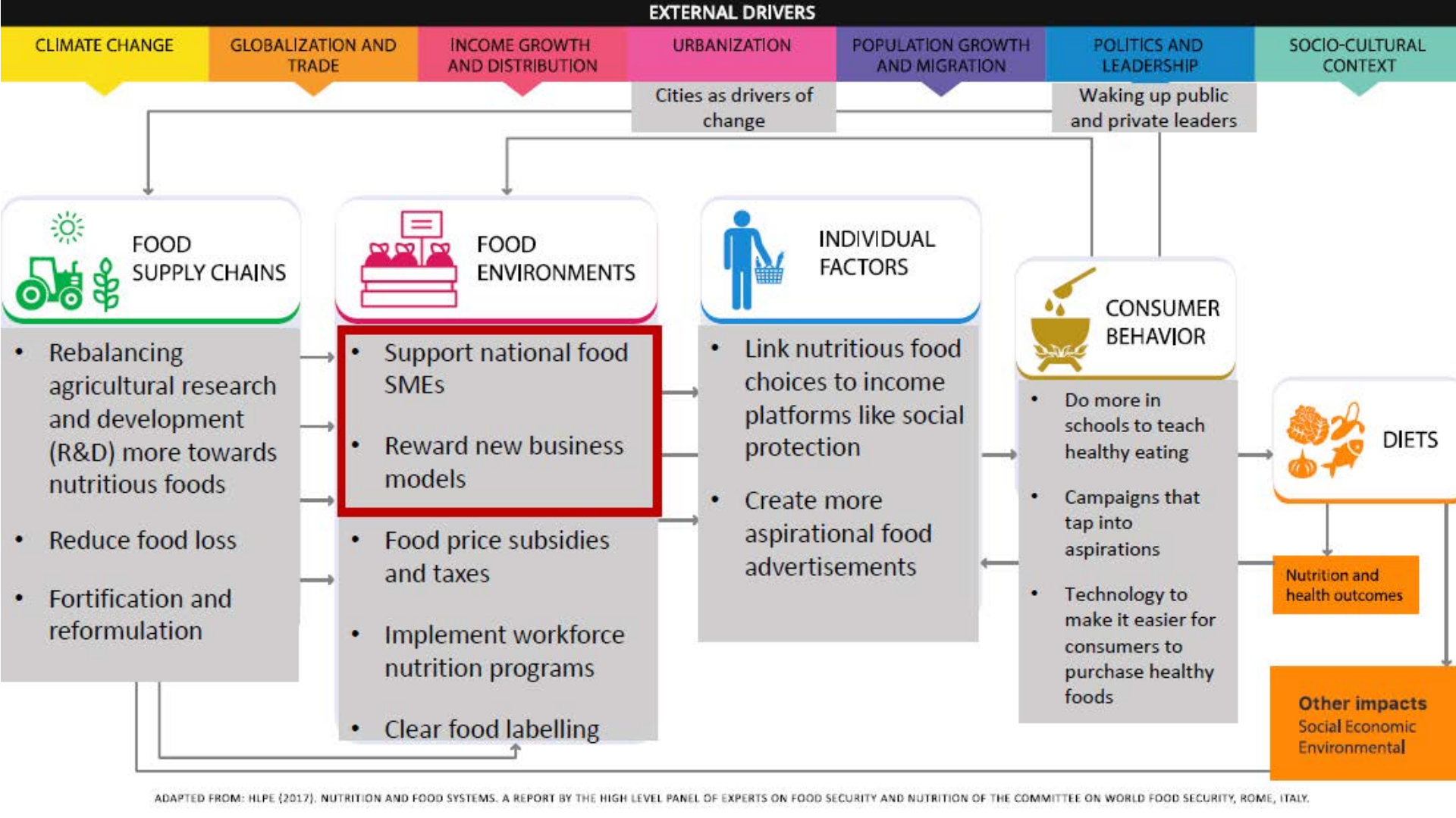


ADAPTED FROM: HLPE (2017). NUTRITION AND FOOD SYSTEMS. A REPORT BY THE HIGH LEVEL PANEL OF EXPERTS ON FOOD SECURITY AND NUTRITION OF THE COMMITTEE ON WORLD FOOD SECURITY, ROME, ITALY.

For India, the Food Systems challenge areas include:

- Losses in supply chain of nourishing perishable foods
- Unaffordability of healthy diets
- Inadequate diet diversity
- Adult raised blood pressure
- Poor soil health
- Threats to biodiversity

Source: GAIN. 2023. "Food Systems Dashboard." Accessed October 15, 2023. https://www.foodsystemsdashboard.org/



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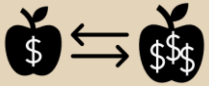
Companies can use innovative business model approaches to increase access to nutritious foods among low-income consumers.

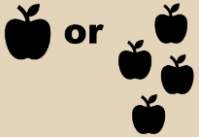
Cost Structure



Cross-subsidize across products or customer groups

Packaging

Use small package sizes, or sell a 'whole' in parts

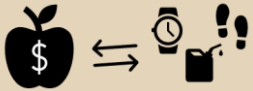


Sell in flexible quantities

Remove packaging, or use reusable packaging

Product

Use less desired parts



Increase perceived value through convenience

Segment products by quality

Repurpose food waste as ingredients or inputs

Replace ingredients with cheaper alternatives

Distribution and Retail

Sell directly to customers in low-income areas

Set up a hub to centralise distribution

Create a bespoke last-mile distribution network

Provide existing retail networks with new support

Nordhagen, S and K. Demmler. 2023. "How Do Food Companies Try to Reach Lower-Income Consumers, and Do They Succeed?" *Global Food Security*. 37:100699. https://doi.org/10.1016/j.gfs.2023.100699

Less-Desired Parts

Use parts of a product that are usually considered less desirable and can be sold more cheaply.

Done for products that would normally be sold as a whole (e.g., chicken) or for which only desirable parts would be sold and others diverted to waste or non-food uses.

To work for nutrition, less-desired parts must not be significantly less nutritious than more-desired ones

EXAMPLE

MozAgri: *goat, Mozambique*

Sells main goat meat to urban markets at market prices and the "fifth quarter" (e.g., organs, intestines, head, bones, and/or fat) to the local rural population around the farm at affordable prices.

Conclusions

- Diet diversification is a priority
- Food behavior is influenced by the interactions of individual, social environmental, physical environmental, and macro systems.
- Food systems data can drive food systems transformation.
- In addition to changing diets, a need for well designed fortification, biofortification, and supplementation.
- Interventions across the education, health, social protection, and food systems can sustain, and reach those with potential to benefit.

Thank you!

gain
Global Alliance for Improved Nutrition

Prevention and Control of Micronutrient Deficiencies through Food & Health Systems Actions: What Will be Required to Achieve Complementary Efforts?
Micronutrient Forum, October 20, 2023, The Hague

Motivating Policymakers to Adopt This Vision: *Data, Evidence Mobilization and Advocacy* Needs for Inter-Sectoral Collaboration

L.M. Neufeld, PhD

Director, Food and Nutrition Division, FAO

Motivating policy makers will require—

Data

That crosses current sectoral boundaries

Evidence mobilization

Is a different skill set than evidence generation and communication

Advocacy

Get (and keep!) the ear of those with the power to enable action

Underpinned by

Deep understanding of policy processes and budget allocations

Enabling and motivating the consumption of healthy diets is the cornerstone of micronutrient deficiency prevention

Adequacy:
All nutrient requirements are met for all nutrients, without excess

Balance:
In dietary energy intake from carbohydrates, proteins, fats

Diversity:
Within and across food groups

Moderation:
In intake of nutrients and foods associated with poor health outcomes

FAO/WHO (under development)

Neither supply nor demand currently favouring healthy diets…in most countries

- High cost of nutritious foods for low-income consumers
- Access issues to fresh foods in some contexts
- Ubiquitous availability and heavy promotion of unhealthy, nutrient poor foods
- "Health" not a major motivator of food choice for all (e.g., Neufeld et al. Lancet 2022)

But comprehensive prevention and control strategies must also recognize the limitations of healthy diets for micronutrients

Adequacy:
All nutrient requirements are met for all nutrients, without excess

Balance:
In dietary energy intake from carbohydrates, proteins, fats

Diversity:
Within and across food groups

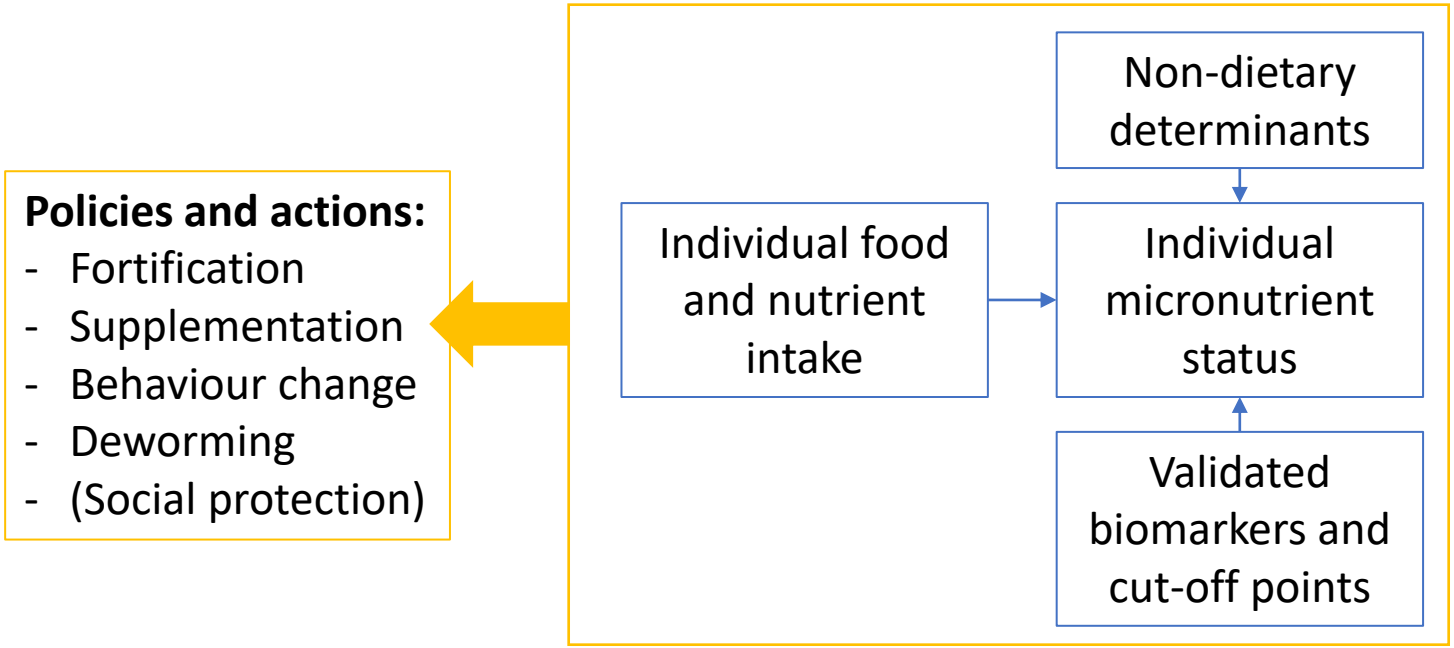
Moderation:
In intake of nutrients and foods associated with poor health outcomes

Not always sufficient to prevent deficiencies:

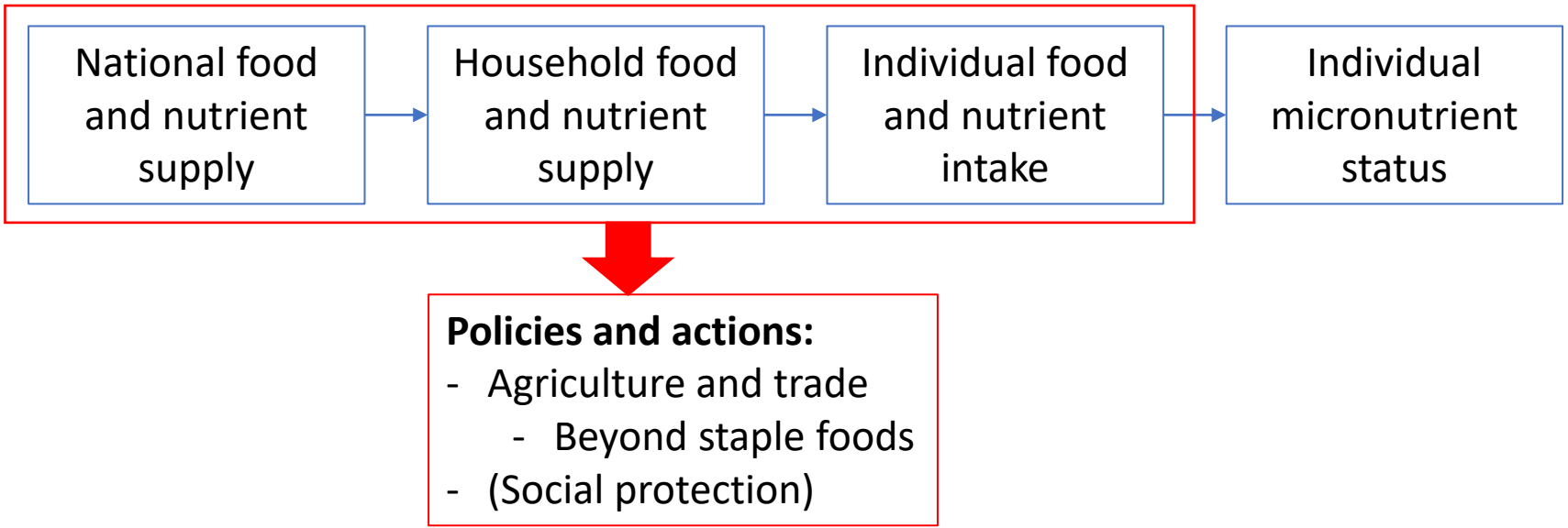
- Difficult to achieve in some life stages (early infancy, pregnancy, adolescence (?), elderly (?))
- Underlying health conditions may affect need, absorption, utilization of nutrition

FAO/WHO (under development)

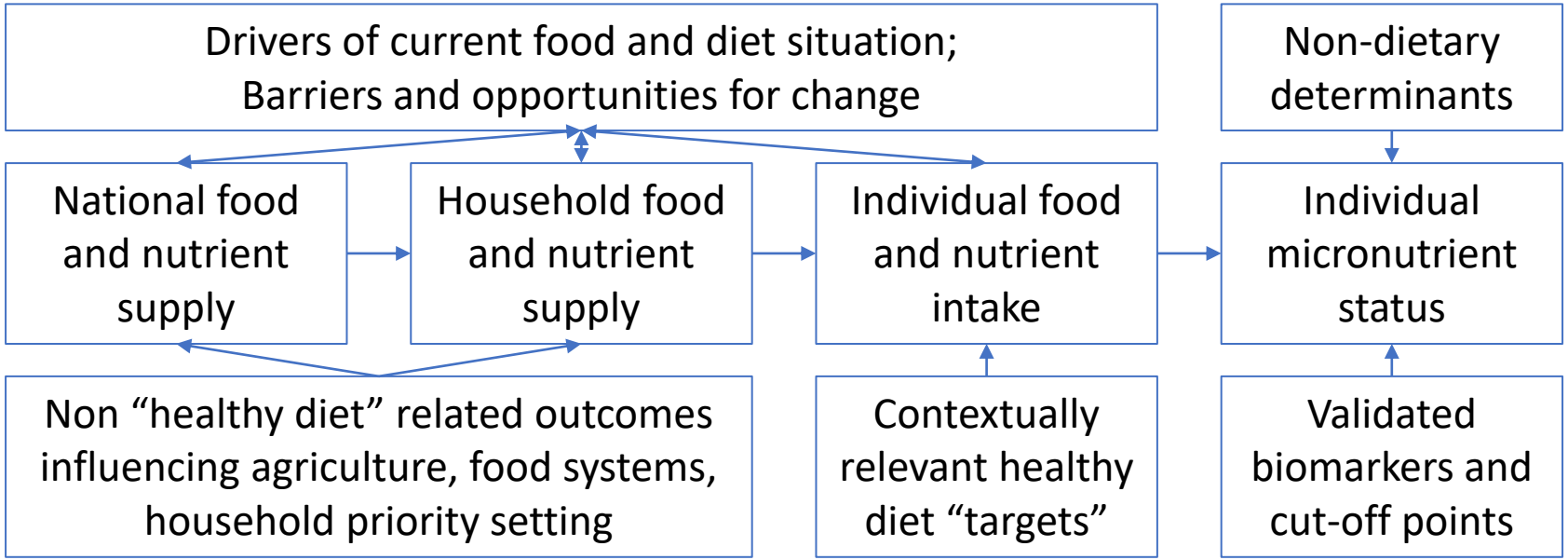
Some (albeit sometimes weak) utilization of micronutrient intake and status data on policy making



Some to date, minimal utilization of micronutrient intake and status data on policy making



Data for a comprehensive prevention and control strategy



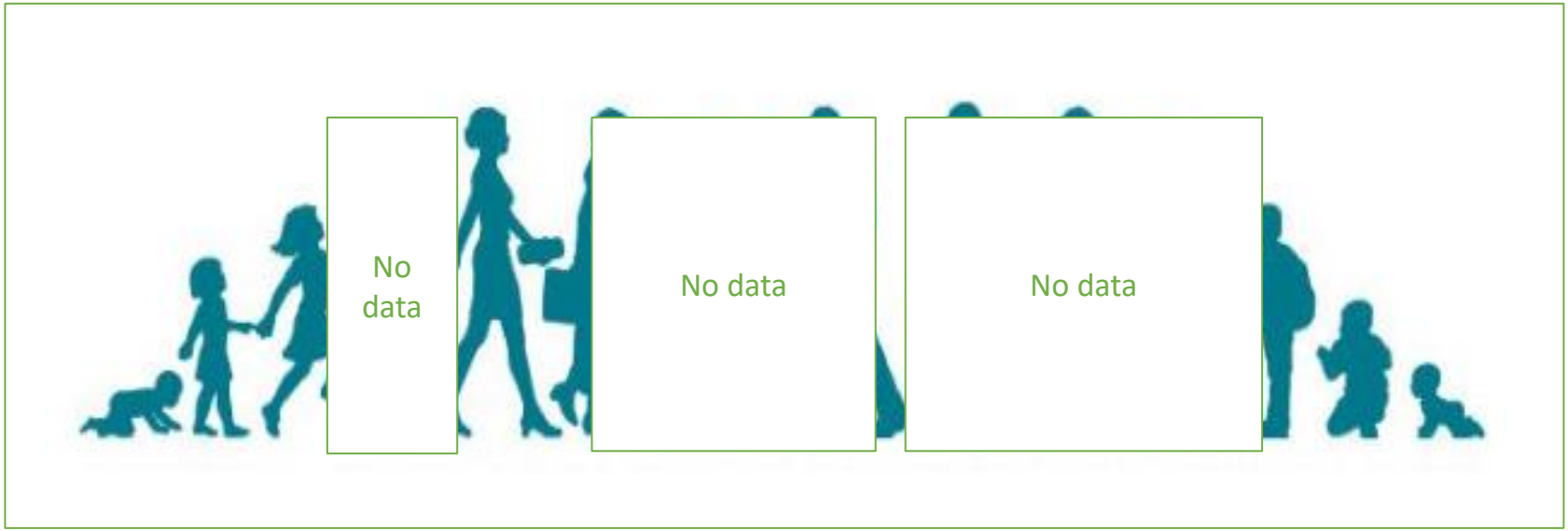
National Dietary Guidelines: An Underutilized Policy Tool

"Dietary patterns"

- The way in which foods are combined into diets over time
- Highly contextual
- Influenced by availability, affordability, preferences, culture, traditions, religion etc.
- May be motivated by social, environmental or other considerations of food production

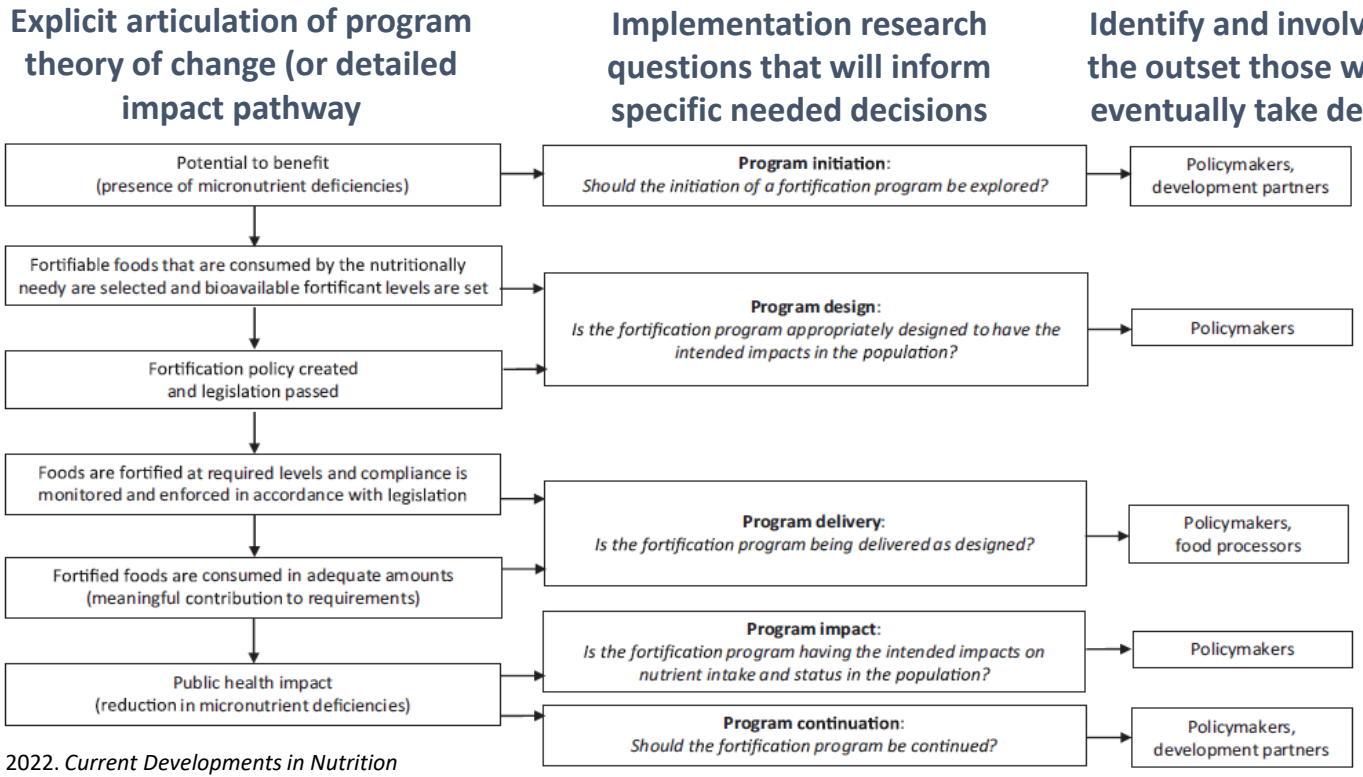
Used to develop contextually appropriate dietary recommendations, while incorporating environment and equity consideration and using a food systems approach

Data on dietary intake and micronutrient deficiency scarce for countries, life stages



Life course image thanks to OHSU

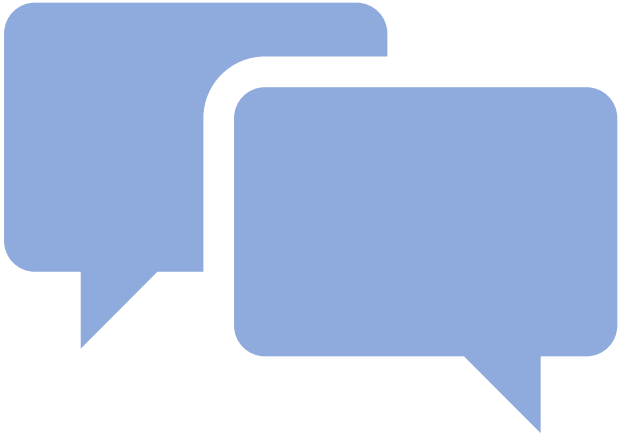
Evidence mobilization: what decisions will policy makers need to make, and what do they need to know to do so?



Friesen et al. 2022. *Current Developments in Nutrition*

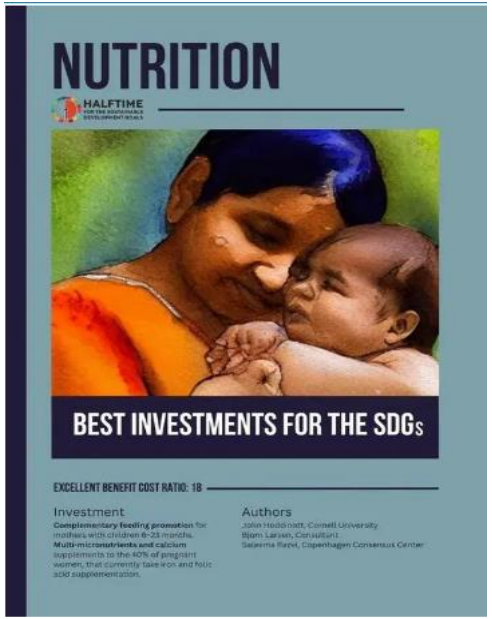
Advocacy

The problem with hidden hunger is that its hidden!



Several resources exist to help make the business case for nutrition investments

Copenhagen Consensus



World Bank 2017

Not as now, developed to resonate toward food (agriculture, trade)

- Actions to promote and enable healthy diets—critical for preventing micronutrient deficiencies—are not included
- The implications of insufficient policy continuity are not [to my knowledge] not addressed

Advocacy

- Healthy diets need to be considered as an outcome until themselves
  - *For their health promoting and disease preventing power*
  - *We need to set targets and track progress towards achieving healthy diets from sustainable food systems*
- Accountability to achieving healthy diets from sustainable food systems must go beyond the nutrition and agriculture sector, e.g.,

Nutrition considerations should be a non-negotiable criteria for climate financing in food crisis regions

Effective research and action to achieve this, will require expanding the knowledge and skills base of nutrition experts

Evidence mobilization

Is a different skill set than evidence generation and communication

Underpinned by

Deep understanding of policy processes and budget allocations

Discussion

Question and Answer Session
Silvia Alayón

Closing Remarks

Omar Dary
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USAID Bureau for Global Health

USAID
FROM THE AMERICAN PEOPLE

USAID ADVANCING NUTRITION

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