Micronutrient FORUM

Nutrition in Crisis

And how science can make a difference…

Dutch Academy of Nutritional Sciences (NAV)

10th Public Lecture

26 January 2023

Saskia Osendarp, PhD

Executive Director, Micronutrient Forum

Micronutrient FORUM

HEALTHY MOTHERS HEALTHY BABIES

Standing Together for Nutrition

DInA
Micronutrient Data Innovation Alliance

MNC | MIGHTY NUTRIENTS COALITION

MICRONUTRIENT FORUM

Global Conference

Key Messages

- Nutrition is in crisis in a world facing:
  - COVID-19
  - Conflicts
  - Food Price Crisis
  - Climate Change

- Science and speaking with a unified voice matters

- Evidence-based policy and investment recommendations are critical to drive impactful actions and programs

- Effective programs make individuals, communities and systems more resilient to future crises

Nutrition science makes a difference

Women's Voices Short Film from Bangladesh

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State of Global Malnutrition

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12 January 2023…….

Inside the 15 worst-affected countries:

40 million children live in food poverty

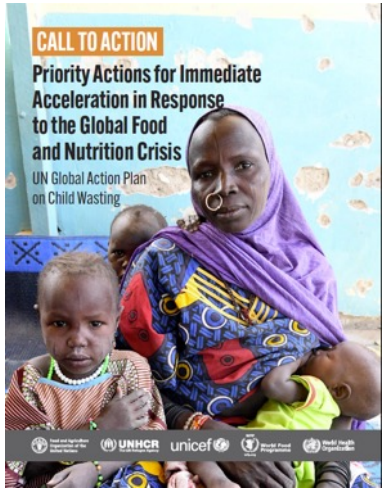
Children under 5 years of age living in food poverty are those being fed severely poor diets that include only 1-2 food groups, day in, day out, in early childhood.

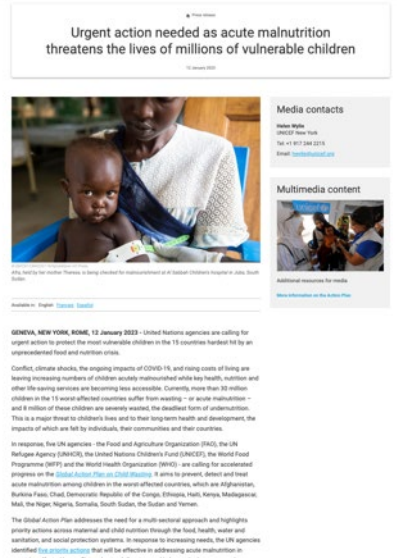
27 million children experience food insecurity

Children under 5 years of age experiencing severe food insecurity are those living in areas classified as being in level 3-5 (urgent action) in the Integrated Phase Classification (IPC) of acute food insecurity.

8 million children suffer from severe wasting

Children under 5 years of age suffering from severe wasting are those with a weight-for-height below minus three standard deviations and/or a mid-upper arm circumference below 115 mm. This can be associated (or not) with nutritional oedema (also known as kwashiorkor).




Urgent action needed as acute malnutrition threatens the lives of millions of vulnerable children

Media contacts

Multimedia content

GENEVA, NEW YORK, ROME, 12 January 2023 - United Nations agencies are calling for urgent action to protect the most vulnerable children in the 15 countries hardest hit by an unprecedented food and nutrition crisis.

UN Global Action Plan on Child Wasting 2023: https://www.unicef.org/media/133236/file/UN%20GAP%20Call%20to%20Action%20.pdf

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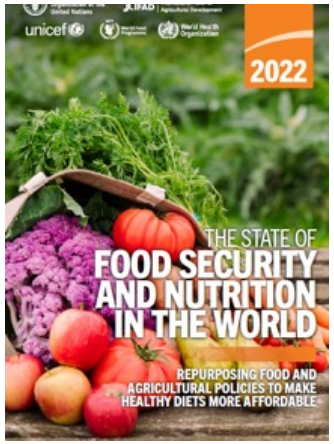
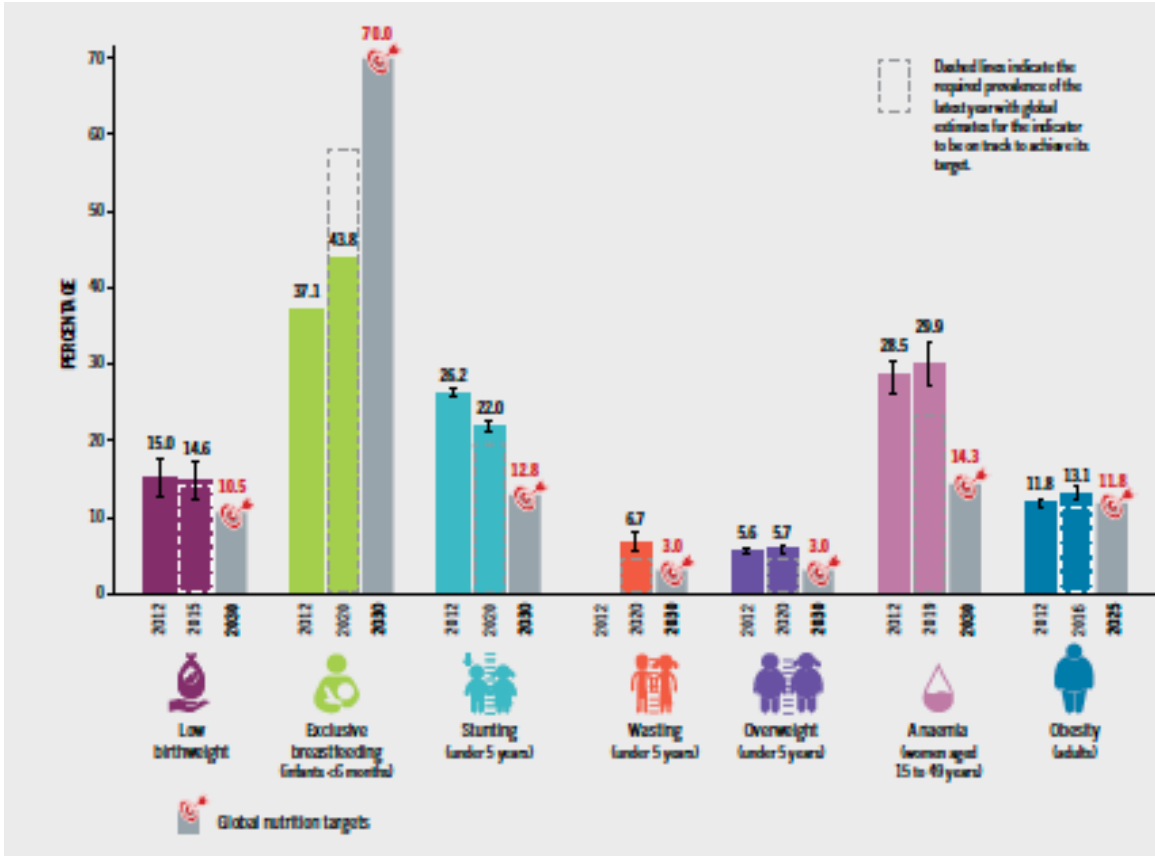
Not on track to meet the SDG2 nutrition targets





The State of Food Security and Nutrition in the World. 2022

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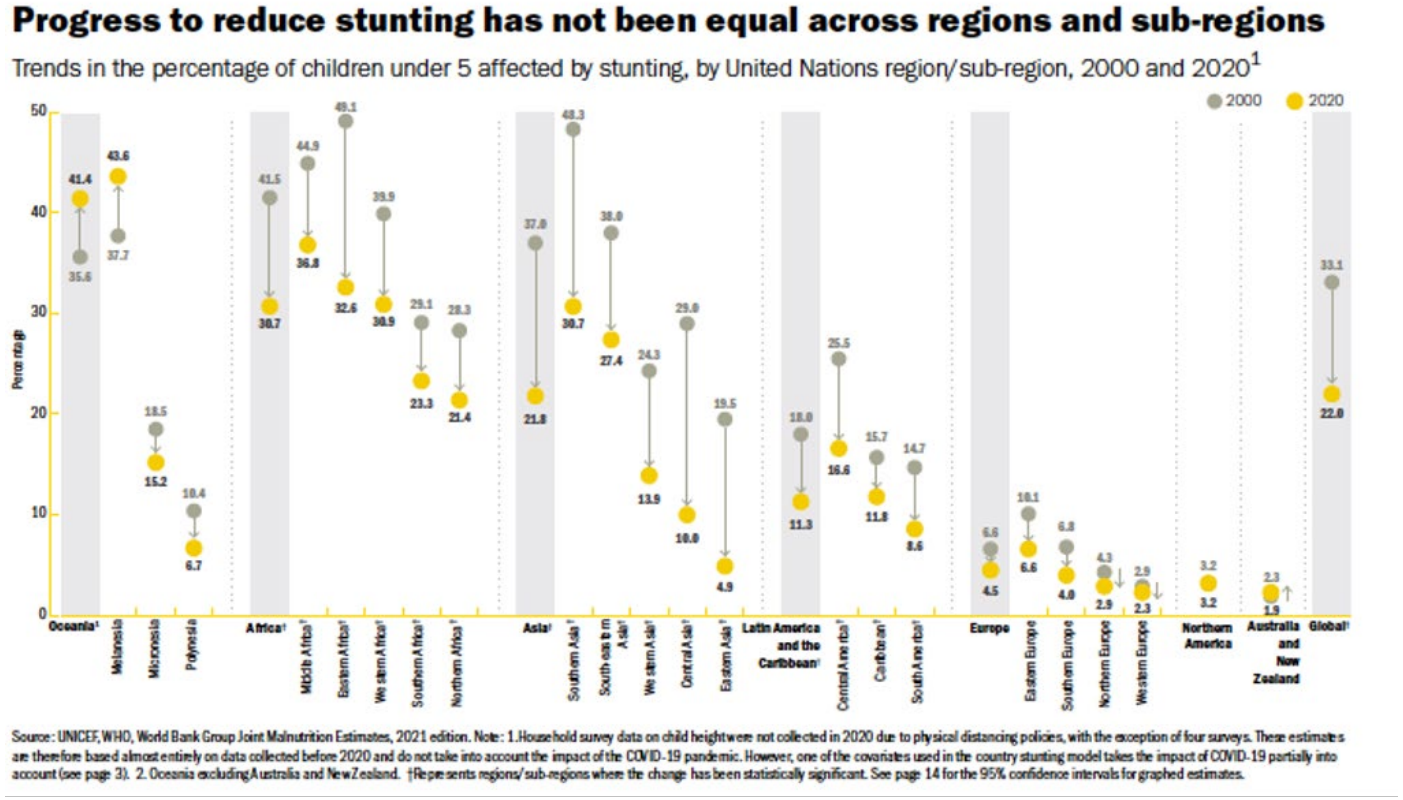
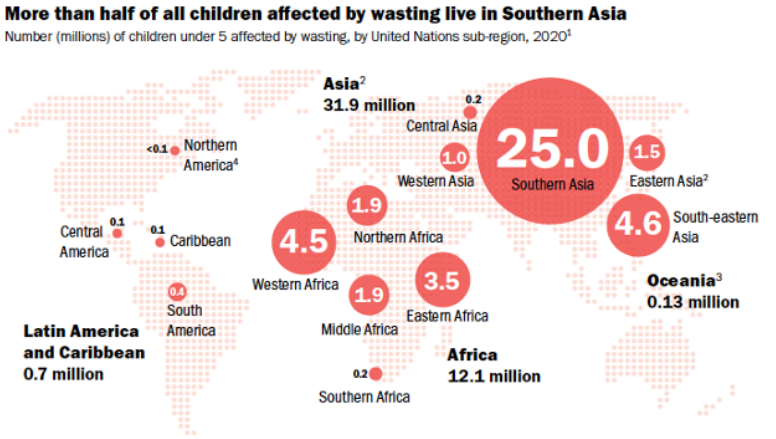
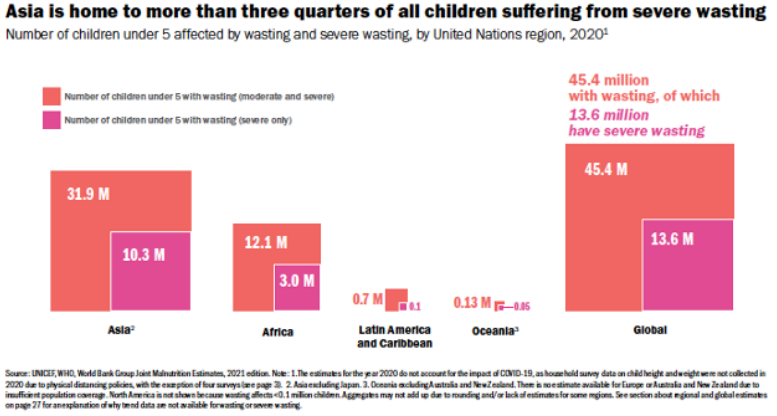
Sharp inequity in progress across regions, sub-regions and communities







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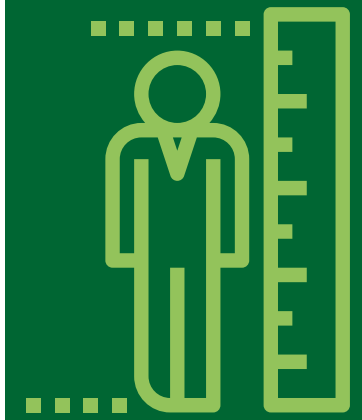
A snapshot: wasting and stunting in children



In 2020, 22% (149 M) of children under 5 were stunted (chronic malnutrition)

6.7% (45.4 M) of children under 5 were wasted (acute malnutrition)

Irreversible and life-long consequences

Impairs health, immune response, brain and physical development.

Role of good nutrition during conception is critical

Source: joint UNICEF/WHO/WB Child Malnutrition Estimats 2021. https://www.who.int/news/item/06-05-2021-the-unicef-who-wb-joint-child-malnutrition-estimates-group-released-new-data-for-2021

Global maternal malnutrition

240 Million

Over 240 million women of reproductive age in low- and middle-income countries are underweight.

570 Million

About 570 million women are anemic.

450 Million

An estimated 450 million are stunted, a sign of chronic undernutrition.

1.World Health Organization. Global Health Observatory: Number of women of reproductive age (aged 15-49 years)) with anaemia. Available here (Accessed 14 March 2022).
2.Child Health Epidemiology Reference Group Small-for-Gestational-Age/Preterm Birth Working Group, Short Maternal Stature Increases Risk of Small-for-Gestational-Age and Preterm Births in Low- and Middle-Income Countries: Individual Participant Data Meta-Analysis and Population Attributable Fraction, The Journal of Nutrition, Volume 145, Issue 11, November 2015, Pages 2542–2550.
3.NCD Risk Factor Collaboration. Trends in adult body-mass index in 200 countries from 1975 to 2014: a pooled analysis of 1698 population-based measurement studies with 19· 2 million participants. The lancet. 2016 Apr 2;387(10026):1377-96.

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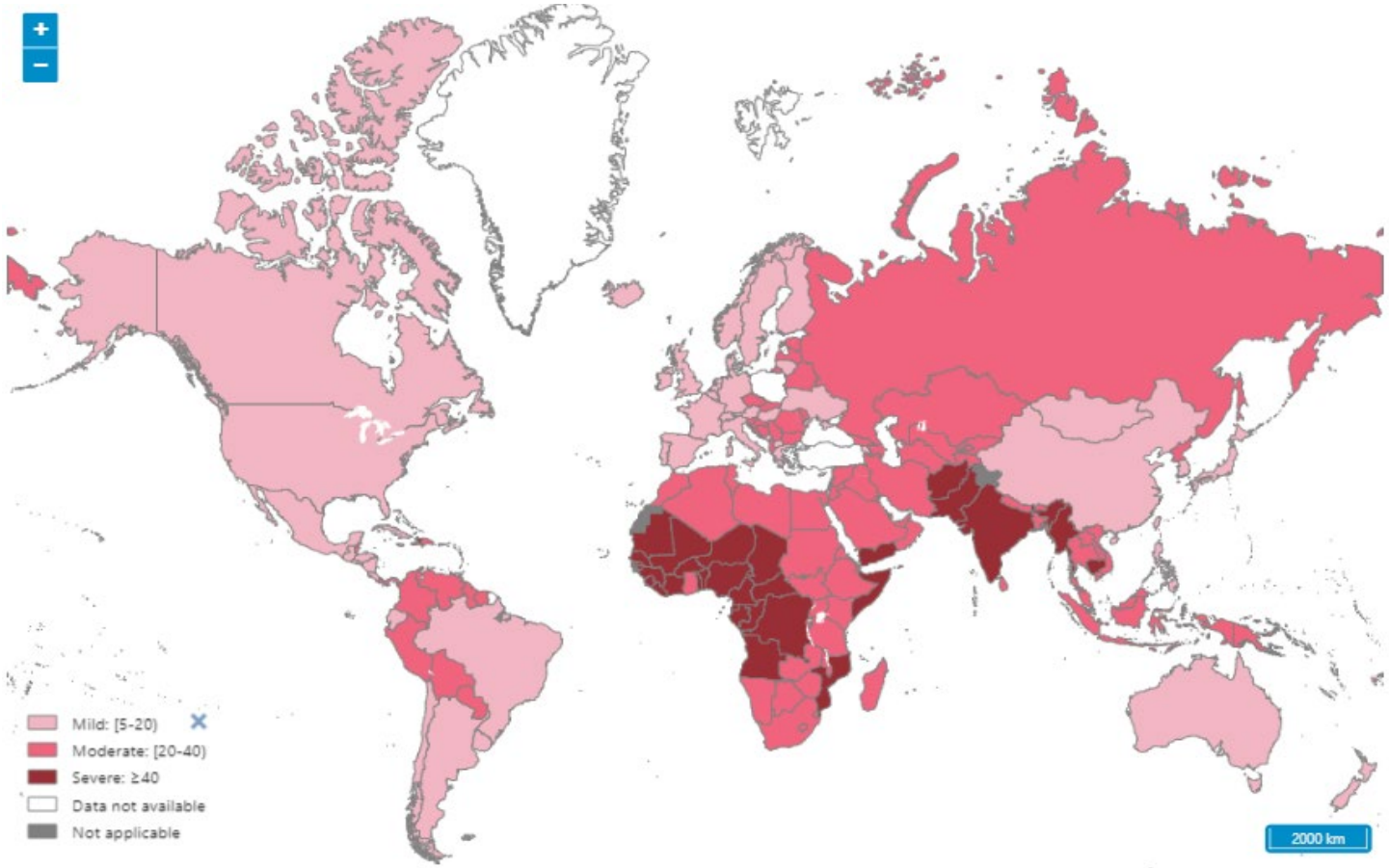
Anemia status worldwide



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

World Health Organization

A 50% reduction of anemia in women by 2025 is the only SDG target related to micronutrient nutrition and women nutrition.

Yet, since 2000 the reduction of anemia in women has been stagnant (WHO, 2021).

WHO: https://www.who.int/data/gho/data/themes/topics/anaemia_in_women_and_children

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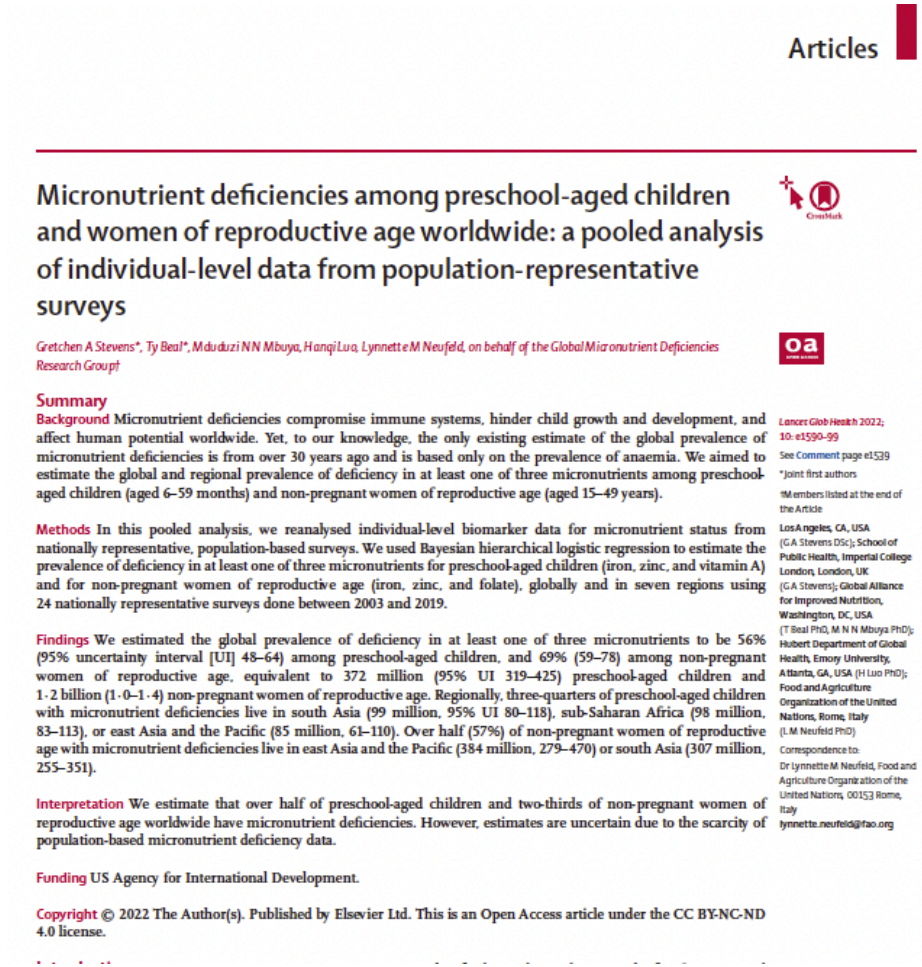
New global estimates of prevalence of micronutrient deficiencies using population-based survey data



Articles

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.

Funding US Agency for International Development.

Lancet Glob Health 2022; 10: e1590–99

See Comment page e1539

*Joint first authors

†Members listed at the end of the Article

Los Angeles, CA, USA (G A Stevens DSc); School of Public Health, Imperial College London, London, UK (G A Stevens); Global Alliance for Improved Nutrition, Washington, DC, USA (T Beal PhD, M N N Mbuya PhD); Hubert Department of Global Health, Emory University, Atlanta, GA, USA (H Luo PhD); Food and Agriculture Organization of the United Nations, Rome, Italy (L M Neufeld PhD)

Correspondence to: Dr Lynnette M Neufeld, Food and Agriculture Organization of the United Nations, 00153 Rome, Italy lynnette.neufeld@fao.org

- First ever global analysis of prevalence of any deficiency using multiple micronutrient biomarkers within individuals
- Focused on preschool-aged children and women of reproductive age due to data availability—just one-third of the global population
- Estimated prevalence of single deficiencies for iron, zinc, folate, vitamin A, vitamin B_{12}, and vitamin D
- Estimated prevalence of deficiency in one of three micronutrients for preschool-aged children (iron, zinc, vitamin A) and women 15–49 (iron, zinc, folate)
- Used thresholds for deficiency with established consensus in the field
- Adjusted for inflammation using the latest evidence

Stevens et al.,(2022) Lancet Global Health

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Estimated prevalence of micronutrient deficiencies worldwide

1.6 billion women of reproductive age and young children have micronutrient deficiencies worldwide.

1 in 2 preschool-age children and **2 in 3** women of reproductive age worldwide have micronutrient deficiencies.

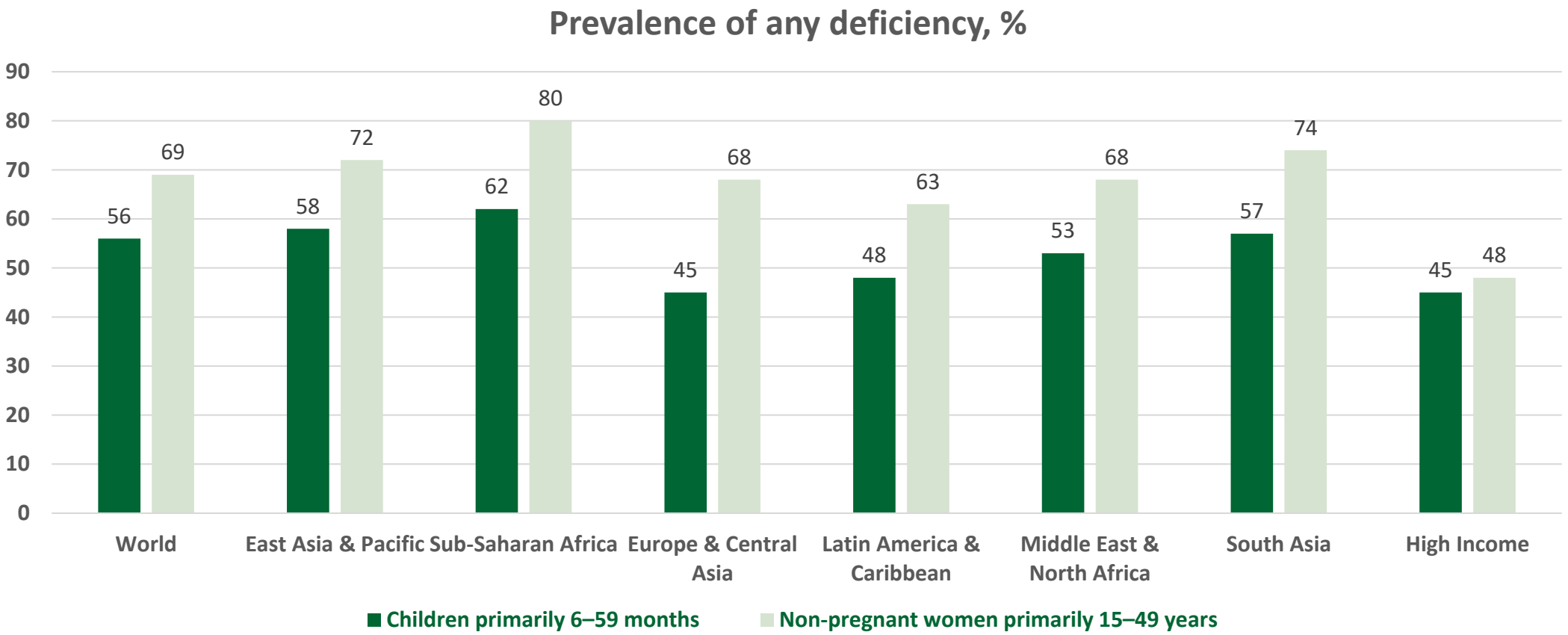
The total number of deficiencies can be even higher when other age groups are considered.

Stevens et al.,(2022) Lancet Global Health

Micronutrient FORUM

Prevalence of deficiencies in children and non-pregnant women

Prevalence of deficiencies in one or more of three core micronutrients, world and different regions (2005–2019)



Stevens et al.,(2022) Lancet Global Health

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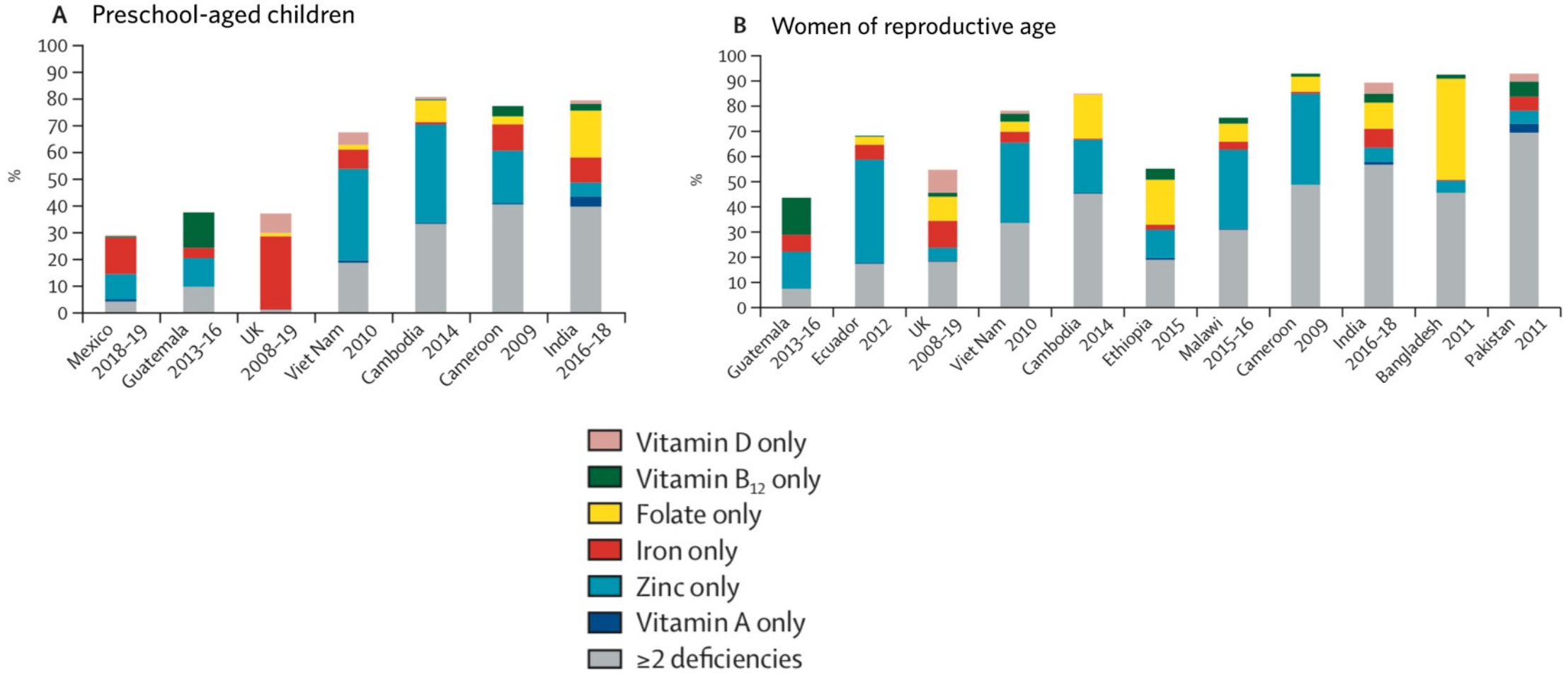
Prevalence of single or two or more micronutrient deficiencies



Stevens et al.,(2022) Lancet Global Health

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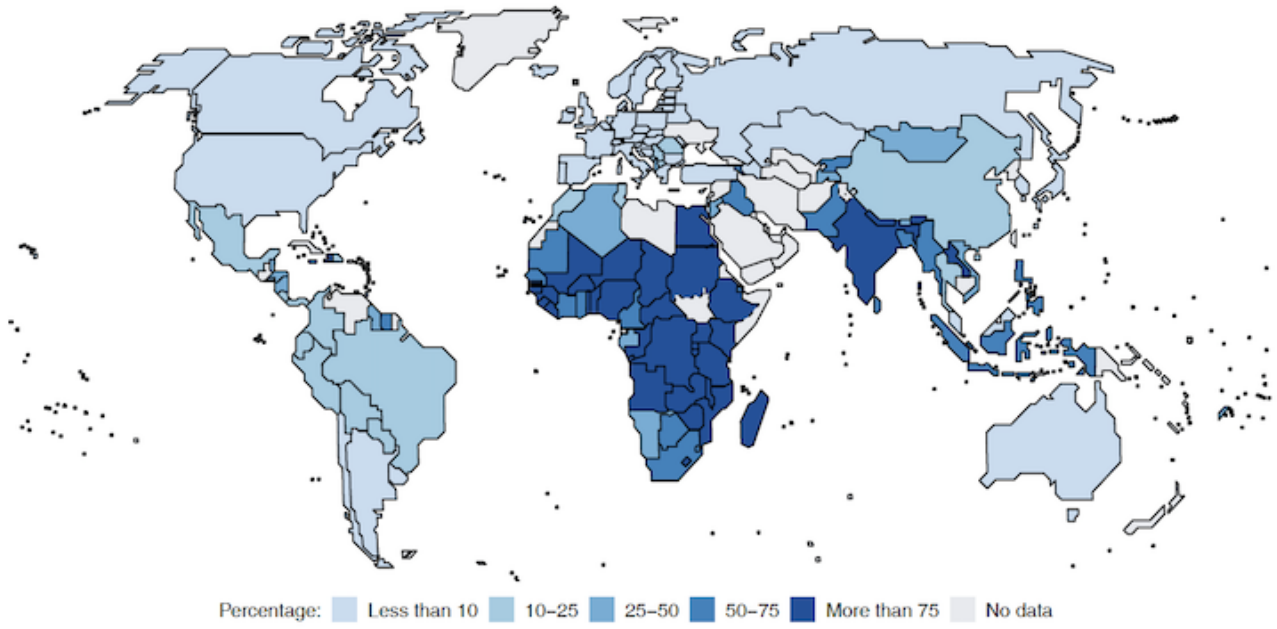
The root cause: healthy diets are out of reach

Healthy diets were out of reach for almost **3.1 billion** people around the world in 2020

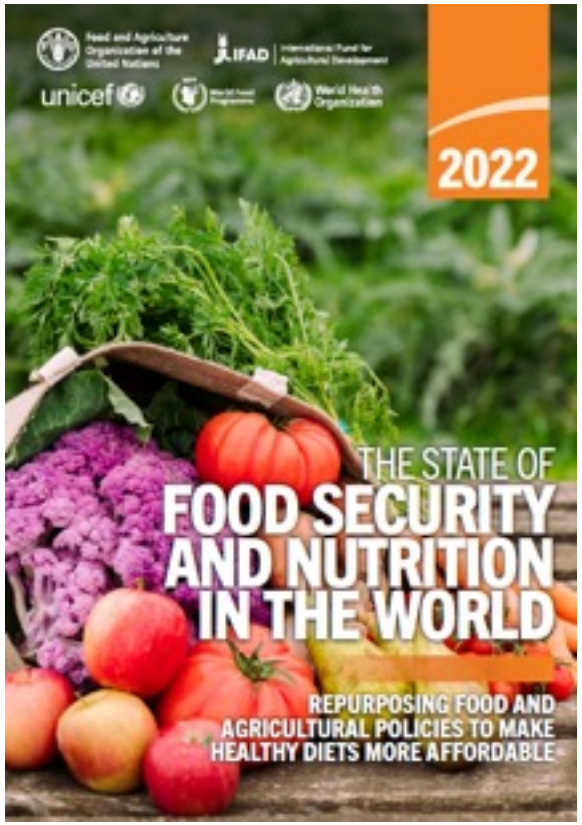
Figure 2

Percentage of population that cannot afford a healthy diet[a]



Source: FAO and others, The State of Food Security and Nutrition in the World 2020.

a The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. The final boundary between South Sudan and the Sudan has not yet been determined. The dotted line represents approximately the line of control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.



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Consequences of maternal and child undernutrition

Morbidity and mortality throughout the life cycle

Economic impacts

The implications of undernutrition and micronutrient deficiencies are life long and can be irreversible

- Increased perinatal complications
- Anemia
- Still birth
- Abortion
- High mortality

Pregnancy

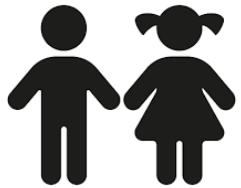
Infancy

Childhood & Adolescence

Adulthood

Old age

- Low birth weight
- Small for Gestational Age
- Impaired cognition
- High mortality
- Risk to chronic diseases



- Stunting
- Reduced cognitive ability and physical growth
- Increased infections

- Low productivity
- Poor immune system
- Fatigue
- Chronic diseases

- High morbidity
- Increased infections

https://www.ssbs.edu.in/micronutrient-deficiencies-throughout-lifecycle.html

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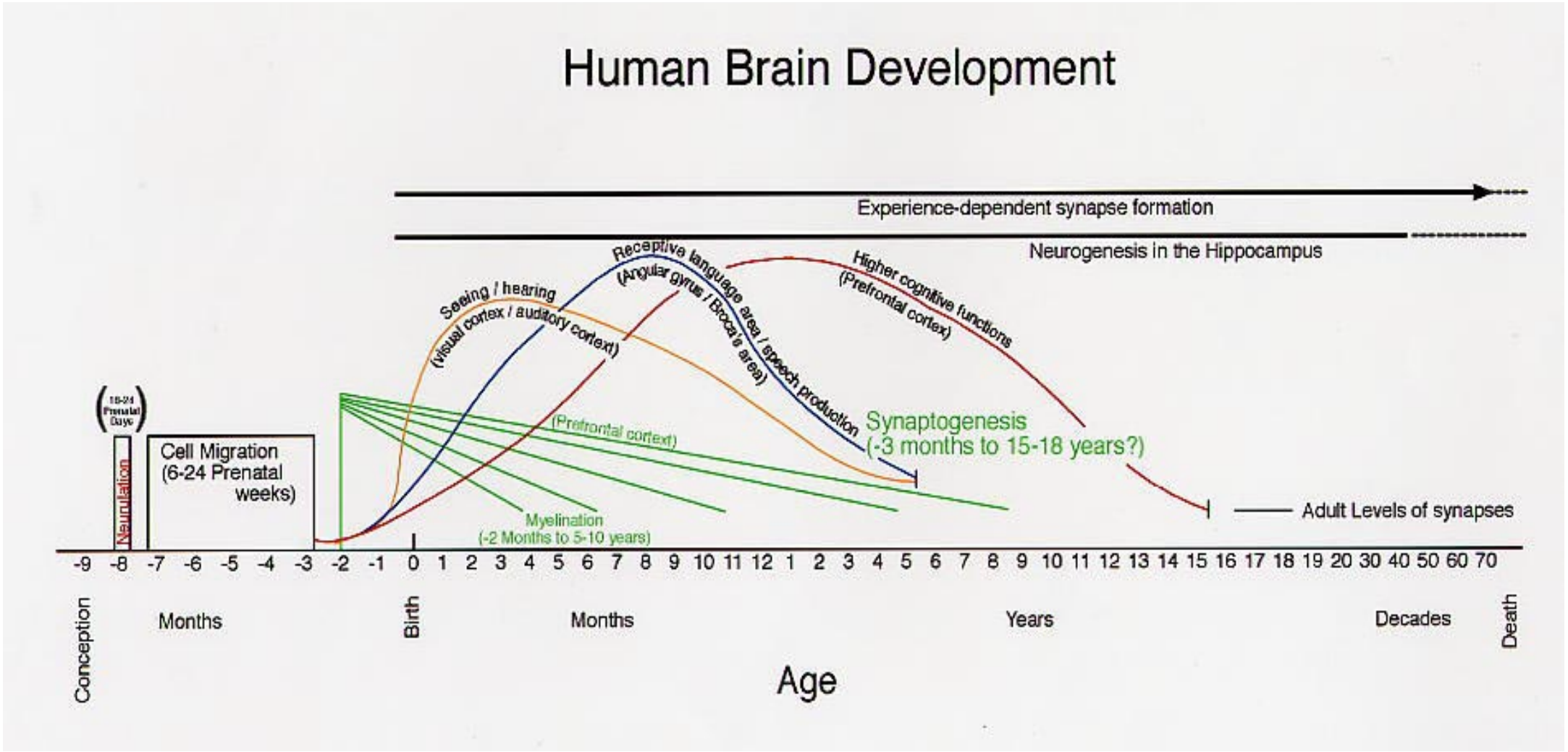
Impact on human brain development



Thompson RA, Nelson Ca. Development. Am Psychol 2001;56:5-15. Animation: Goglay et al., 2007.

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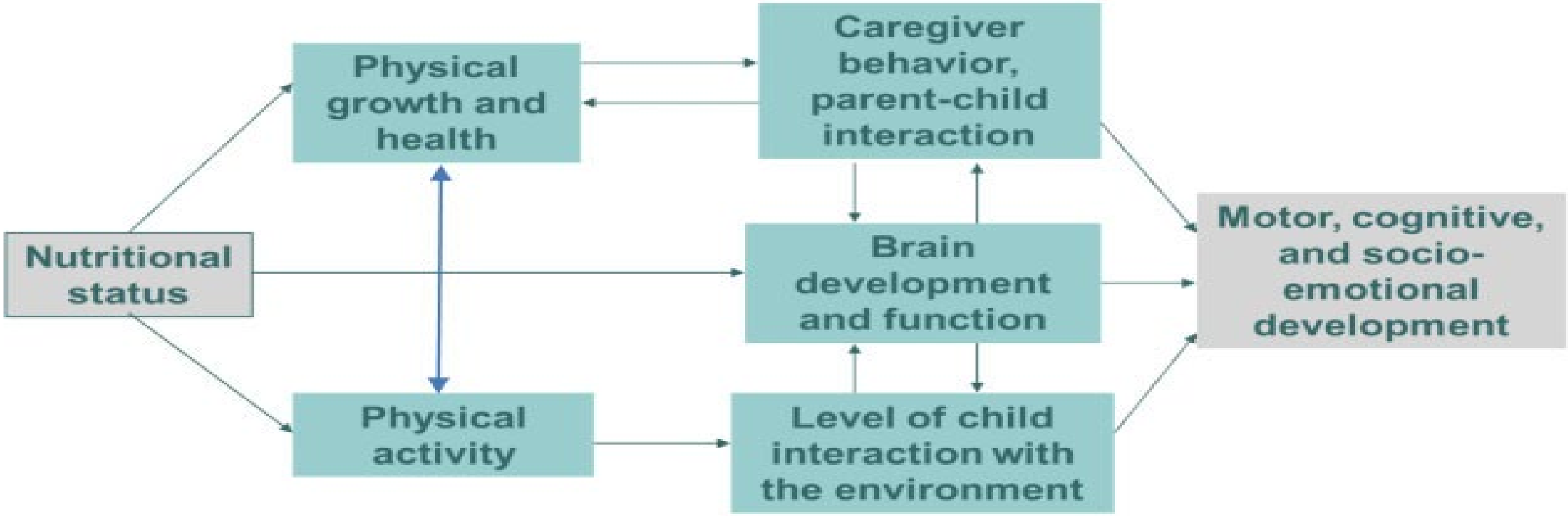
Impact on child development



Adapted from Levitsky and Barnes and Pollitt. From: Prado and Dewey, 2014

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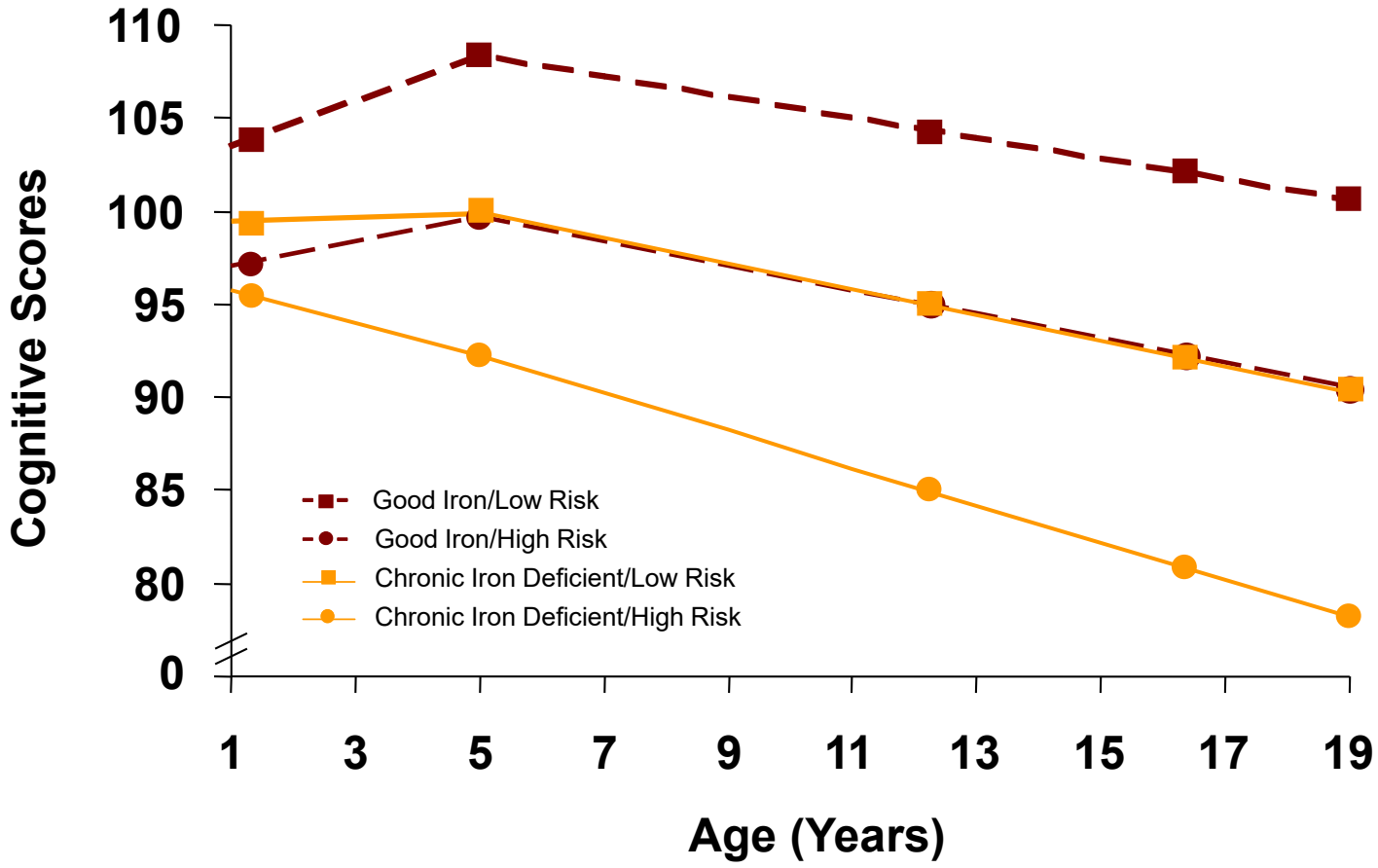
Long-term effects of Iron Deficiency (ID) on cognitive scores in children



Lozoff et al., Arch Pediatr Adolesc Med. 2006;160(11):1108-1113. doi:10.1001/archpedi.160.11.1108

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Impact on immune response

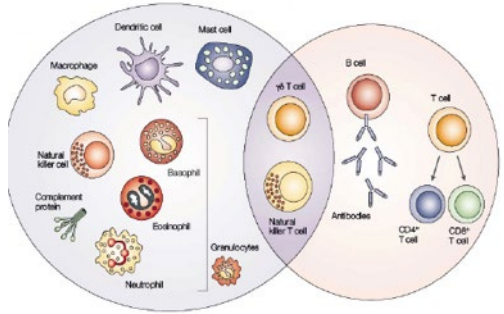
MAINTAINING BARRIER FUNCTION	• **Protein** • **Vitamin A**	Key for mucosal barrier integrity
IMMUNE CELL FUNCTION & PROLIFERATIVE RESPONSE	• **Vitamin A** • **Vitamin D** • **Folate** • **Vitamin B12, B6** • **Iron** • **Zinc**	Proliferation requires energy, structure substrates, and cofactors Essential roles in the production and development of all new cells including immune cells
REDUCING OXIDATIVE DAMAGE	• **Vitamin C** • **Vitamin E** • **Iron** • **Zinc** • **Copper** • **Selenium** • **Glutamine.** • **Arginine**	Antioxidant nutrients protect immune cells and keep the oxidative burst in check Certain immune cells produce a concentrated burst of reactive oxygen species (ROS), which help kill pathogens. Prolonged and continuous exposure to ROS can lead to damage and disease

Gombart et al. Nutrients, 2020

Specific micronutrients are necessary for specific functions for all phases in the immune response

- **All phases** of the immunity response are **affected in malnutrition**
- There is **significant overlap** between **micronutrients** and **functions** and each play key roles - individually and synergistically
- Individual and combined deficiencies
  - will **reduce immune competence** and/or
  - **disrupt** systemic **inflammatory regulation.**

MN "requirements" are for the healthy to stay healthy



Slide courtesy: Jose M. Saavedra

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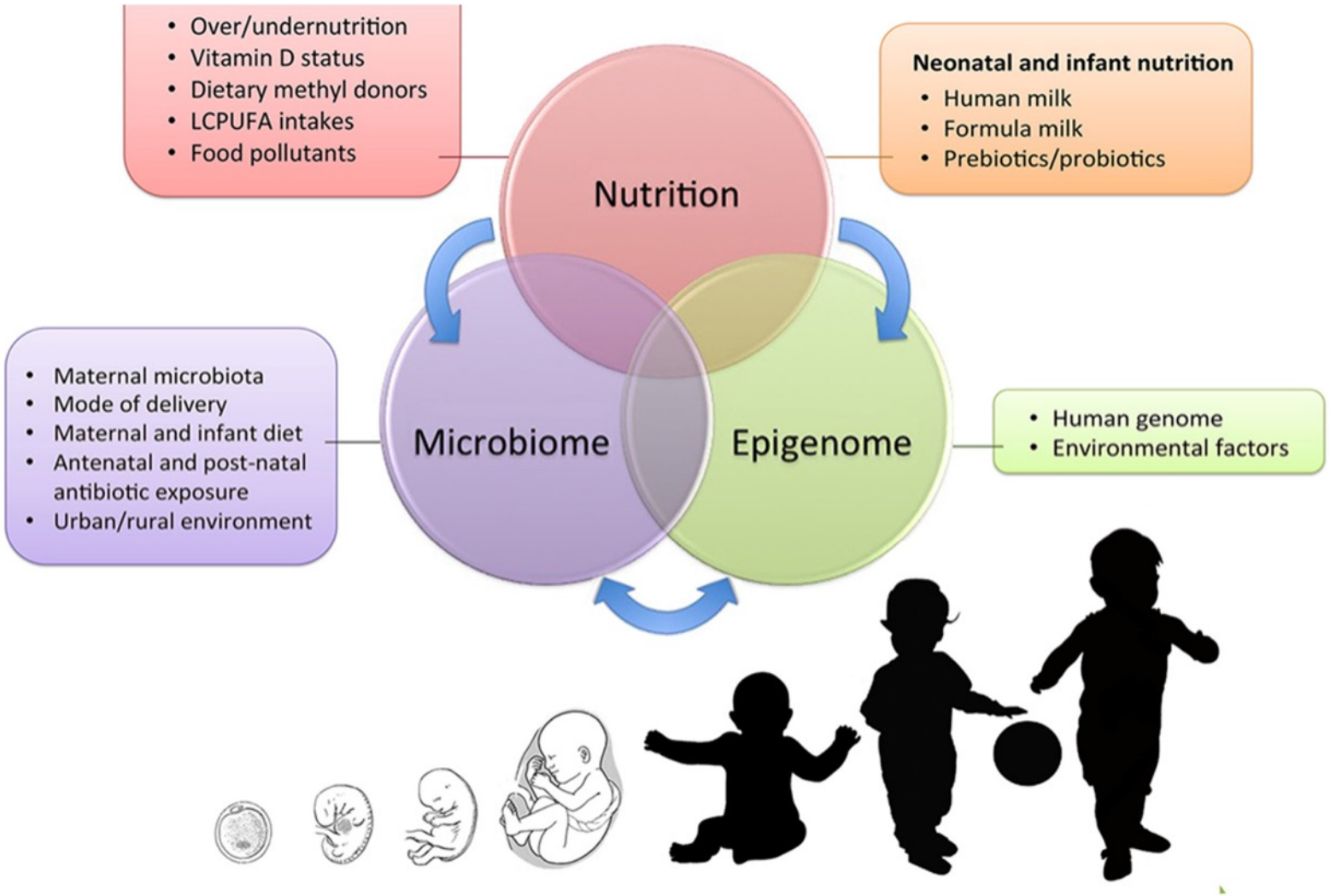
Impact on long-term health



New evidence is emerging on the critical role of **good nutrition during conception** and early gestation programming risks of overweight and diet-related chronic diseases later in life

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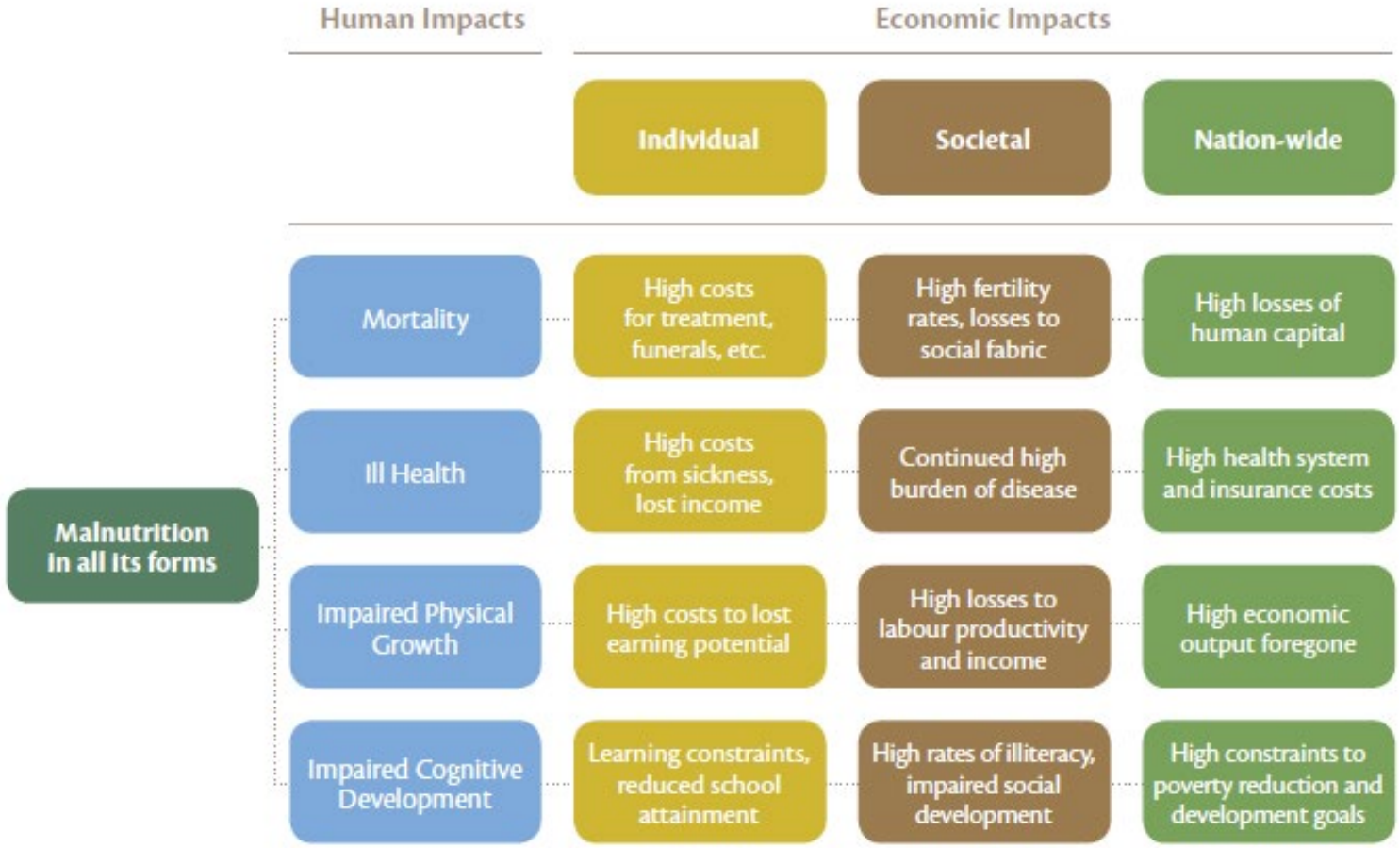
Impact on the global economy…..

The economic costs of undernutrition, in terms of lost national productivity and economic growth, are significant— our economy and society is paying **USD 3 trillion** a year in the form of productivity loss, ranging from **3 to 16%** (or more) of GDP in low-income settings.

Figure 1: Conceptual framework for understanding the economic impacts of malnutrition in all its forms



https://www.worldbank.org/en/topic/nutrition/overview#2

Nutrition in Crisis 2020-2022

COVID -19

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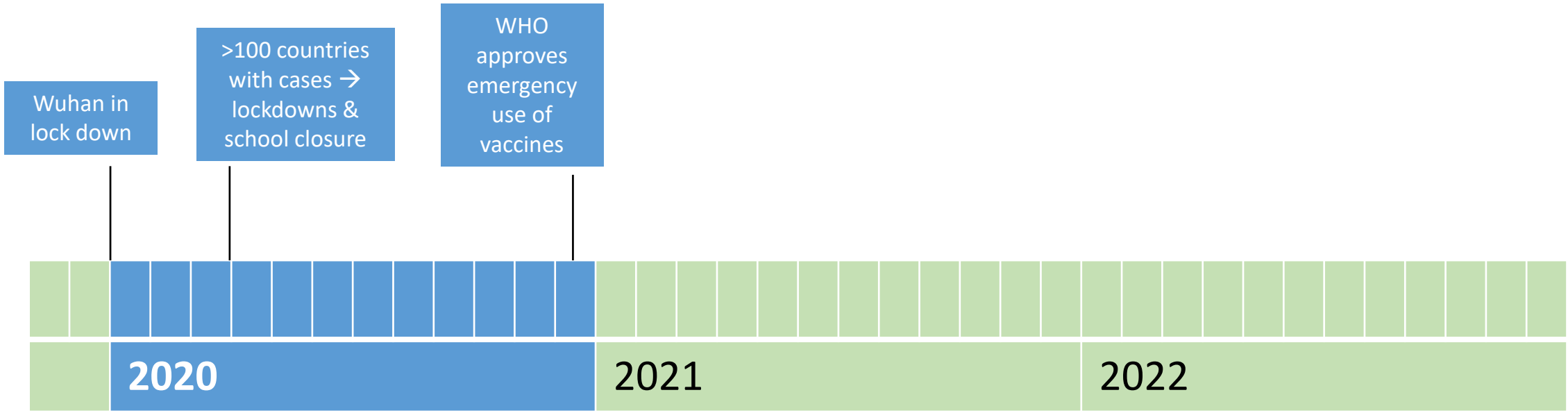
The unfolding global shocks of 2020-2022



Slide Courtesy: Rebecca Heidkamp

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Standing Together for Nutrition

ST4N was formed in April 2020 as a unified voice delivering evidence to inform advocacy on impact of global crises

& 600+ individual signatories

https://www.standingtogetherfornutrition.org

The COVID-19 Crisis

Triple Threat of the Pandemic:

the extraordinary loss of jobs and incomes

disrupted food systems decreasing access and availability of nutrient-rich diets

disrupted essential health services such as for severe wasting

https://www.standingtogetherfornutrition.org

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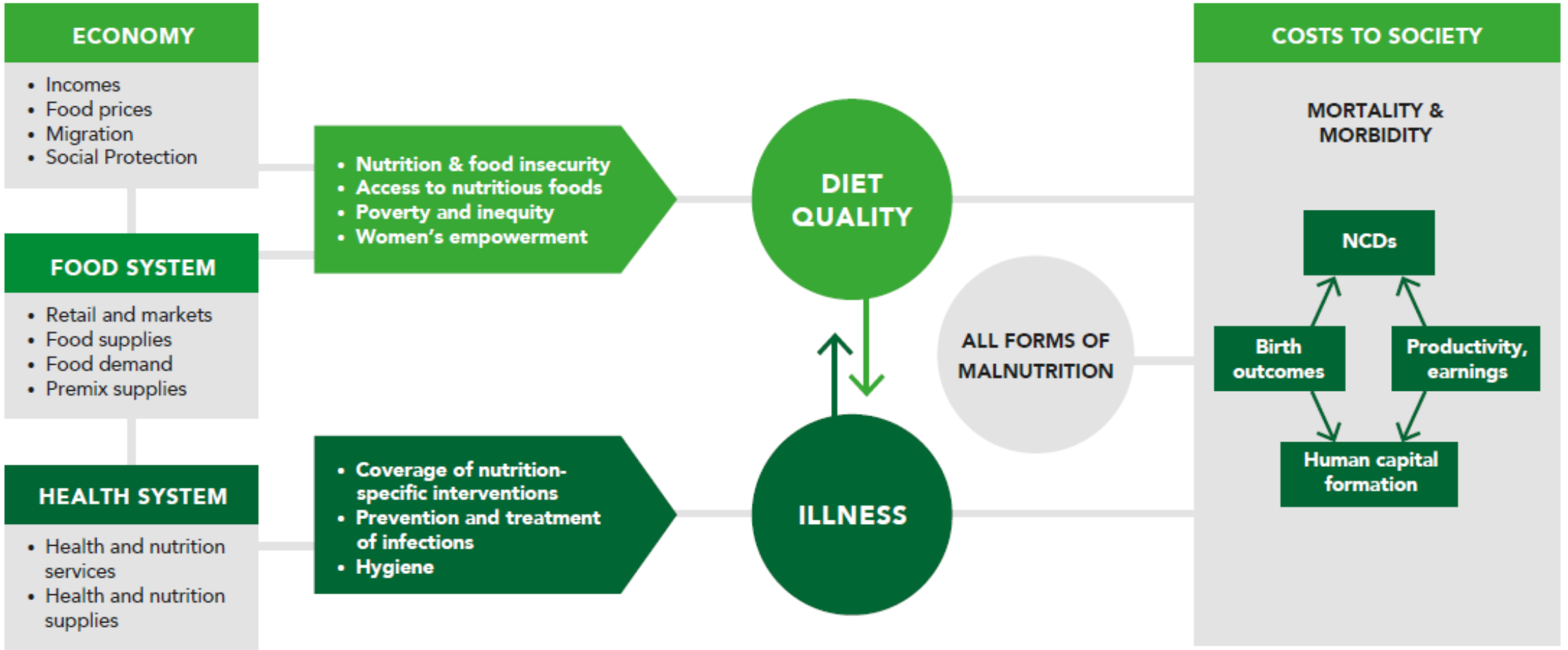
Conceptual Framework



https://www.standingtogetherfornutrition.org

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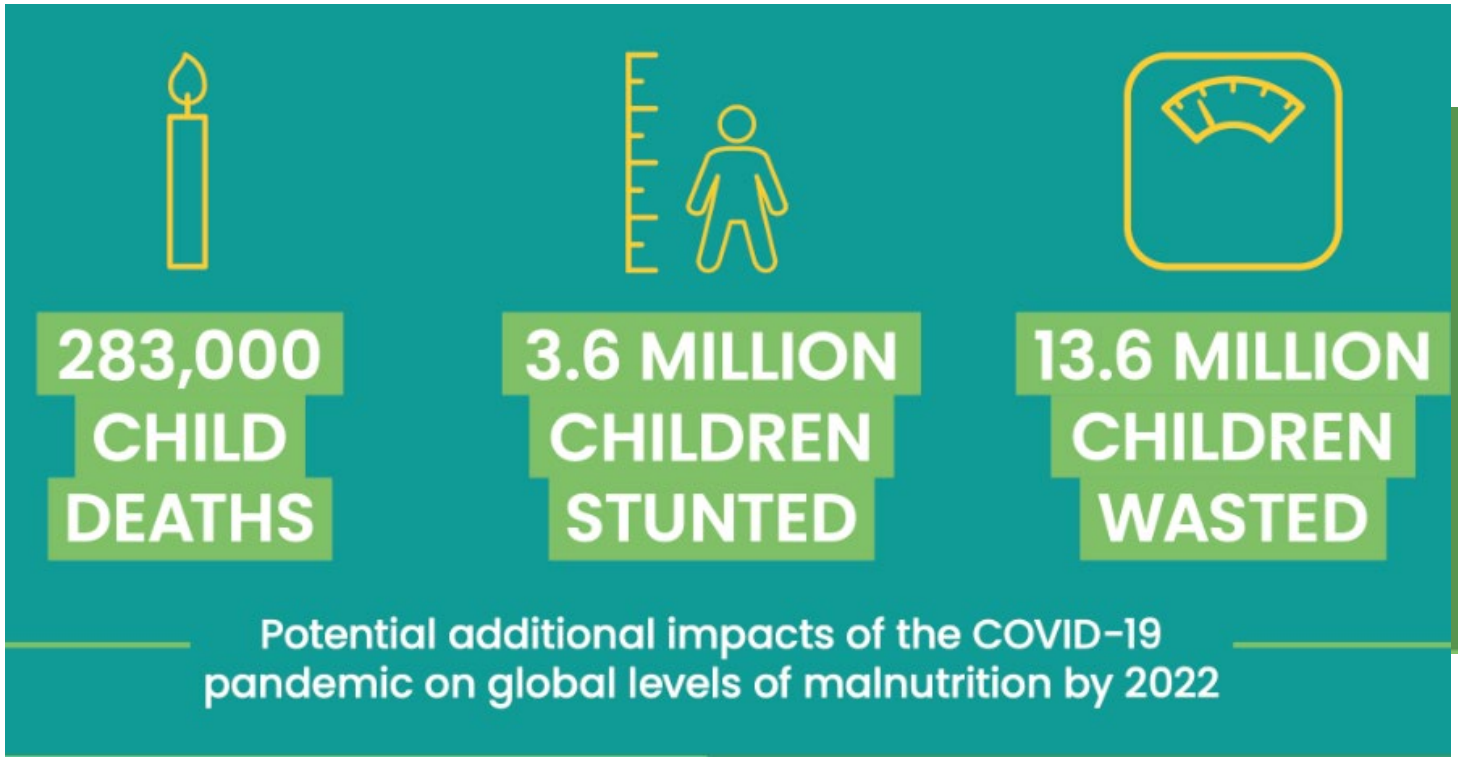
Evidence generated by modeling



The estimated pandemic related increases in child stunting and child mortality may result in future productivity losses of

44.3 billion

https://www.standingtogetherfornutrition.org

2020: Early evidence for the potential impacts of COVID-19 crisis on child wasting

Standing Together for Nutrition

Lancet July 2020

Comment

Impacts of COVID-19 on childhood malnutrition and nutrition-related mortality

The unprecedented global social and economic crisis triggered by the COVID-19 pandemic poses grave risks to the nutritional status and survival of young children in low-income and middle-income countries (LMICs). Of particular concern is an expected increase in child malnutrition, including wasting, due to steep declines in household incomes, changes in the availability and affordability of nutritious foods, and interruptions to health, nutrition, and social protection services.[1]

One in ten deaths among children younger than 5 years in LMICs is attributable to severe wasting because wasted children are at increased risk of mortality from infectious diseases.[2] Before the COVID-19 pandemic, an estimated 47 million children younger than 5 years were moderately or severely wasted, most living in sub-Saharan Africa and south Asia.[3]

The economic, food, and health systems disruptions resulting from the COVID-19 pandemic are expected to continue to exacerbate all forms of malnutrition. Estimates from the International Food Policy Research Institute suggest that because of the pandemic an additional 140 million people will be thrown into living in extreme poverty on less than US$1·90 per day in 2020.[4] According to the World Food Programme, the number of people in LMICs facing acute food insecurity will nearly double to 265 million by the end of 2020.[5] Sharp declines are expected in access to child health and nutrition services, similar to those seen during the 2014–16 outbreak of Ebola virus disease in sub-Saharan Africa.[6] Early in the COVID-19 pandemic, UNICEF estimated a 30% overall reduction in essential nutrition services coverage, reaching 75–100% in lockdown contexts, including in fragile countries where there are humanitarian crises.[7]

The accompanying call to action on child malnutrition and COVID-19 from leaders of four UN agencies[8] in *The Lancet* is an important first step for the international community. Alongside these efforts, the Standing Together for Nutrition consortium, a multidisciplinary consortium of nutrition, economics, food, and health systems researchers, is working to estimate the scale and reach of nutrition challenges related to COVID-19. These efforts link three approaches to model the combined economic and health systems impacts from COVID-19 on malnutrition and mortality: MIRAGRODEP's macroeconomic projections of impacts on per capita gross national income (GNI);[9] microeconomic estimates of how predicted GNI shocks impact child wasting using data on 1·26 million children from 177 Demographic Health Surveys (DHS) conducted in 52 LMICs between 1990–2018;[3] and the Lives Saved Tool (LiST), which links country-specific health services disruptions and predicted increases in wasting to child mortality.[10]

What do our initial analyses and estimates suggest? First, the MIRAGRODEP projections suggest that even fairly short lockdown measures, combined with severe mobility disruptions and comparatively moderate food systems disruptions, result in most LMICs having an estimated average 7·9% (SD 2·4%) decrease in GNI per capita relative to pre-COVID-19 projections.[4]

Second, the microeconomic model projections indicate that decreases in GNI per capita are associated with large increases in child wasting.[3] Our own analyses, based on these estimates applied to 118 LMICs, suggest there could be a 14·3% increase in the prevalence of moderate or severe wasting among children younger than 5 years due to COVID-19-related predicted

Panel: Five urgent actions to protect children's right to nutrition in the COVID-19 pandemic

- Safeguard and promote access to nutritious, safe, and affordable diets
- Invest in improving maternal and child nutrition through pregnancy, infancy, and early childhood
- Re-activate and scale up services for the early detection and treatment of child wasting
- Maintain the provision of nutritious and safe school meals for vulnerable children
- Expand social protection to safeguard access to nutritious diets and essential services

28 Jul 2020

29 Jul 2020

CNN

BBC WORLD NEWS

All | Economy | Hotspots | Masks | Politics | Reopening | S

3 Posts

↑ 95 New Updates

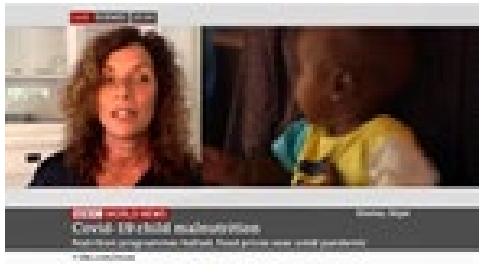
10:38 p.m. ET, July 27, 2020

Nearly 7 million more children could suffer from acute malnutrition due to Covid-19 pandemic, analysis says

From CNN's Gisela Crespo

Nearly 7 million more children worldwide could suffer from acute malnutrition due to the impact of the Covid-19 pandemic, according to an analysis published Monday in the Lancet medical journal.

Disruptions in mobility and food systems caused by even relatively short lockdowns will result in a decrease of nearly 8% of gross national income (GNI) per capita compared to pre-pandemic projections.



The Other Way Covid Will Kill: Hunger

Worldwide, the population facing life-threatening levels of food insecurity is expected to double, to more than a quarter of a billion ...

nytimes.com

Everyone can reply

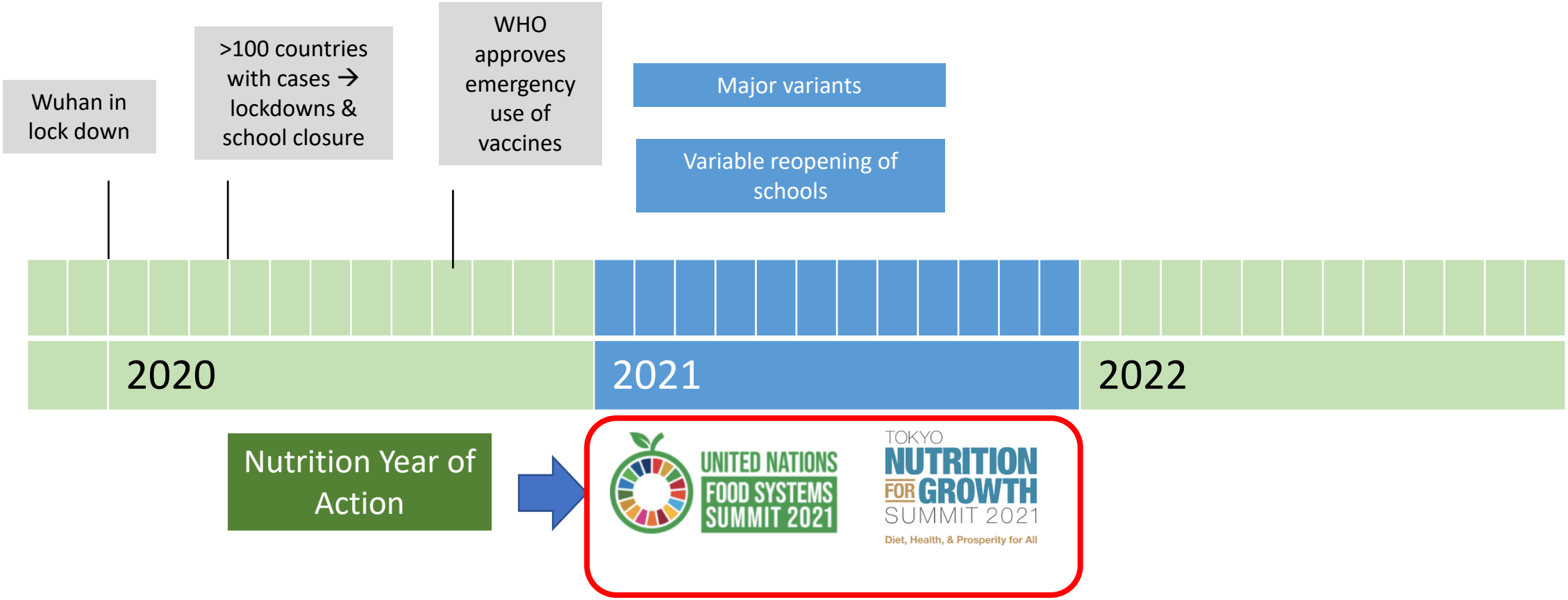
11 Sep 2020

The New York Times

Cited ST4N modeled impacts on wasting over a 1-year horizon

Micronutrient FORUM

The unfolding global shocks of 2020-2022

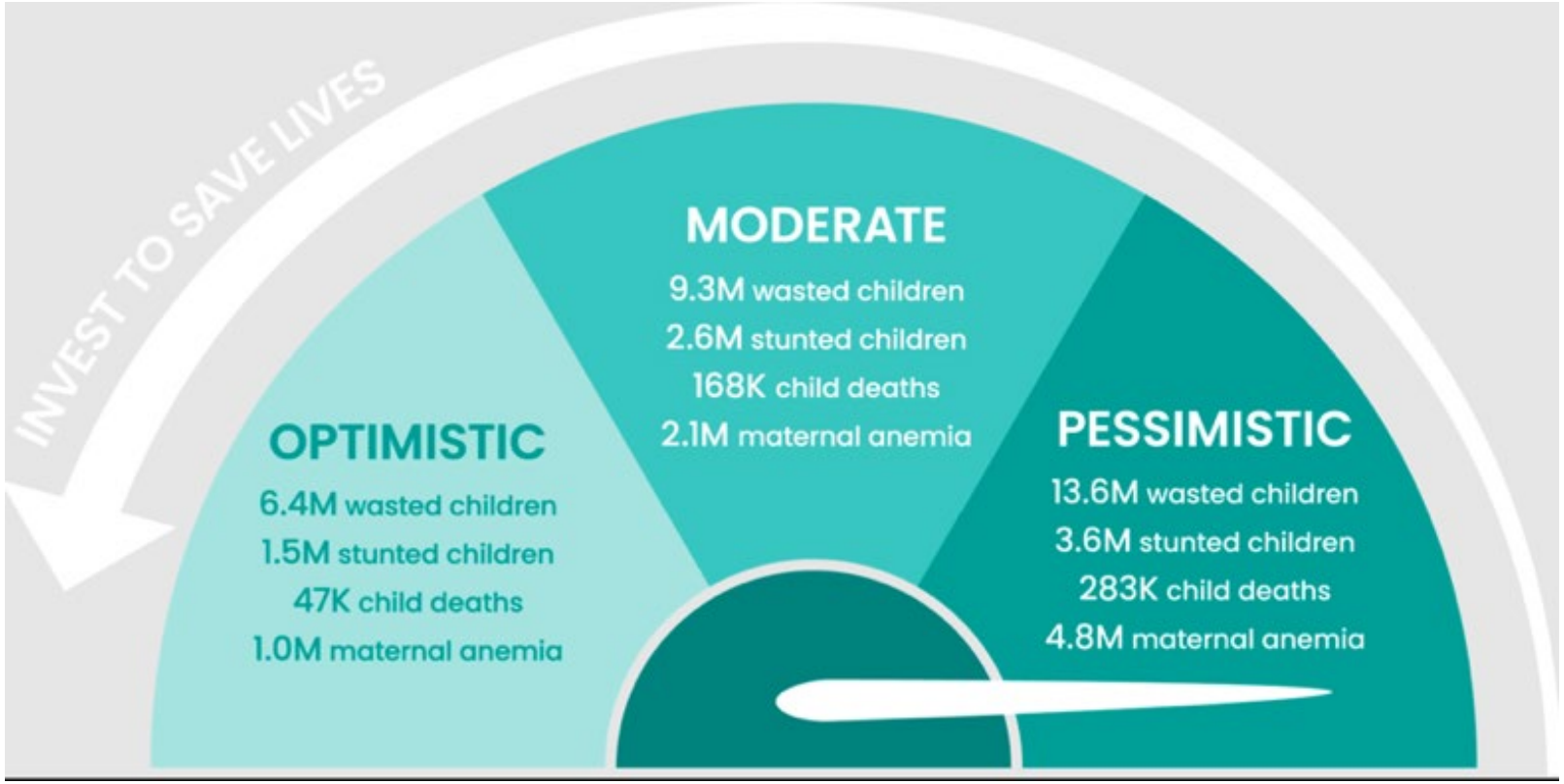


Slide Courtesy: Rebecca Heidkamp

Micronutrient FORUM

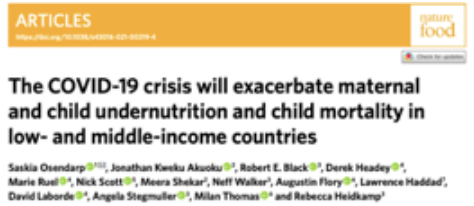
ST4N's updated projected COVID-19 impacts

COVID-19 impacts on nutritional outcomes (3y horizon) & affordability of healthy diets



- **+141 million** in addition to **3 billion** cannot afford a healthy diet
- **50%** cannot afford even **50%** of cost of a healthy diet

Laborde, D., Herforth, A., Headey, D. et al. COVID-19 pandemic leads to greater depth of unaffordability of healthy and nutrient-adequate diets in low- and middle-income countries. Nat Food 2, 473–475 (2021). https://doi.org/10.1038/s43016-021-00323-8


ARTICLES

nature food

The COVID-19 crisis will exacerbate maternal and child undernutrition and child mortality in low- and middle-income countries

Osendarp, S., Akuoku, J.K., Black, R.E. et al. The COVID-19 crisis will exacerbate maternal and child undernutrition and child mortality in low- and middle-income countries. Nat Food 2, 476–484 (2021). https://doi.org/10.1038/s43016-021-00319-4

Disruptions due to COVID-19

COVID-19 school disruptions were widespread & lasted longer than health system disruptions

Global development

Term starts in Uganda – but world's longest shutdown has left schools in crisis

Pre-Covid the country battled poor learning outcomes, now experts fear fee rises and school closures will see many more children miss out

Uganda's students have returned to school after the world's longest school closure. Photograph: Esther Ruth Mbabazi/Reuters

The gate that once proudly displayed the name of Godwins primary school in Kampala has been removed. The compound, where pupils played at break time, is now a parking area for trucks ferrying goods to the nearby market, while the classrooms have been turned into a travellers' lodge.

Global development is supported by BILL & MELINDA GATES foundation

About this content

Alon Mwesigwa *in Kampala*

Fri 14 Jan 2022 04.15 EST

The Guardian

Jan 2022

Gender Framework

Social Science & Medicine 312 (2022) 115364

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

COVID-19, nutrition, and gender: An evidence-informed approach to gender-responsive policies and programs

Anna Kalbarczyk [a,*], Noora-Lisa Aberman [b], Bregje S.M. van Asperen [c], Rosemary Morgan [a], Zulfiqar Bhutta [d,e], Bianca Carducci [d], Rebecca Heidkamp [a], Saskia Osendarp [c], Neha Kumar [f], Anna Lartey [g], Hazel Malapit [f], Agnes Quisumbing [f], Cecilia Fabrizio [c]

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[g] University of Ghana, Legon, Ghana

ABSTRACT

In addition to the direct health impacts of COVID-19, government and household mitigation measures have triggered negative indirect economic, educational, and

Sept 2022

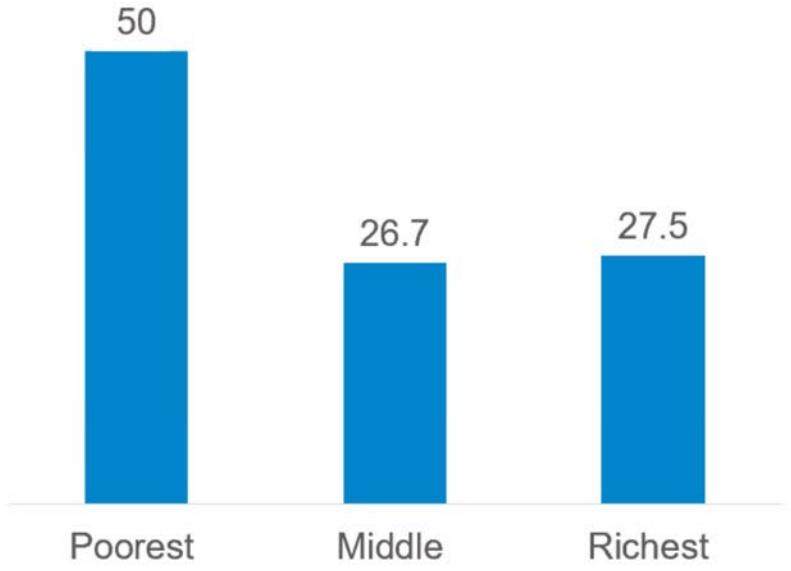
Vulnerable poor disproportionately impacted

Crises reinforce inequality in food systems

COVID-19 impacts in Ethiopia

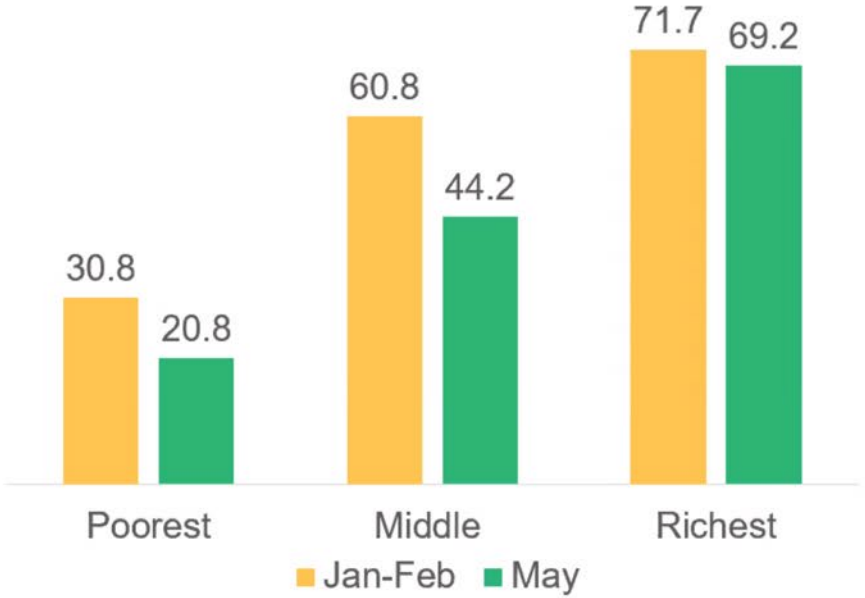
Poor people suffer more from INCOME declines

% of households that have much lower incomes, 2020



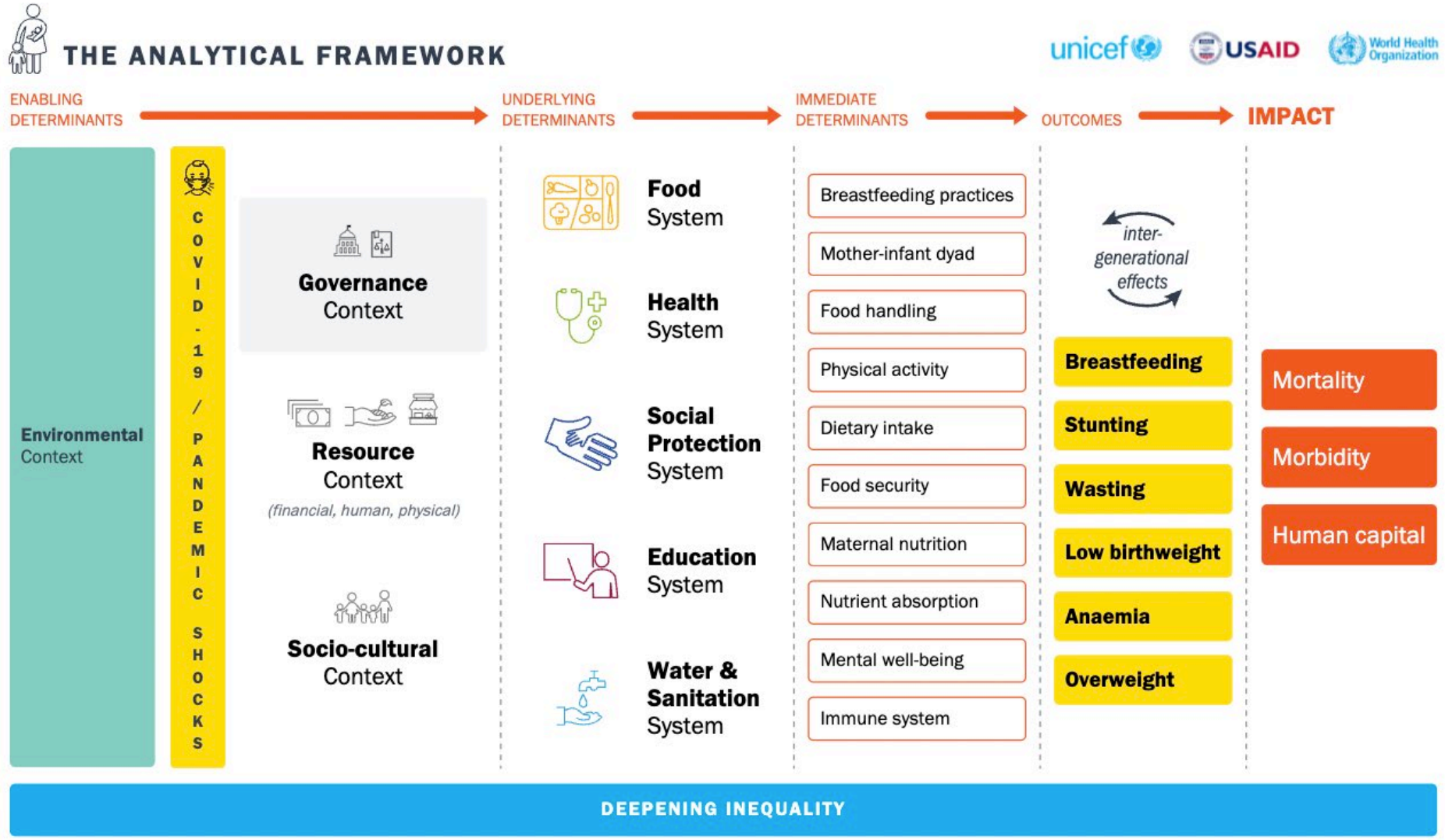
Poor people suffer more from NUTRITION effects

% of households consuming dairy products, 2020



Source: Hirvonen et al. 2020; Tesfaye et al. 2020.

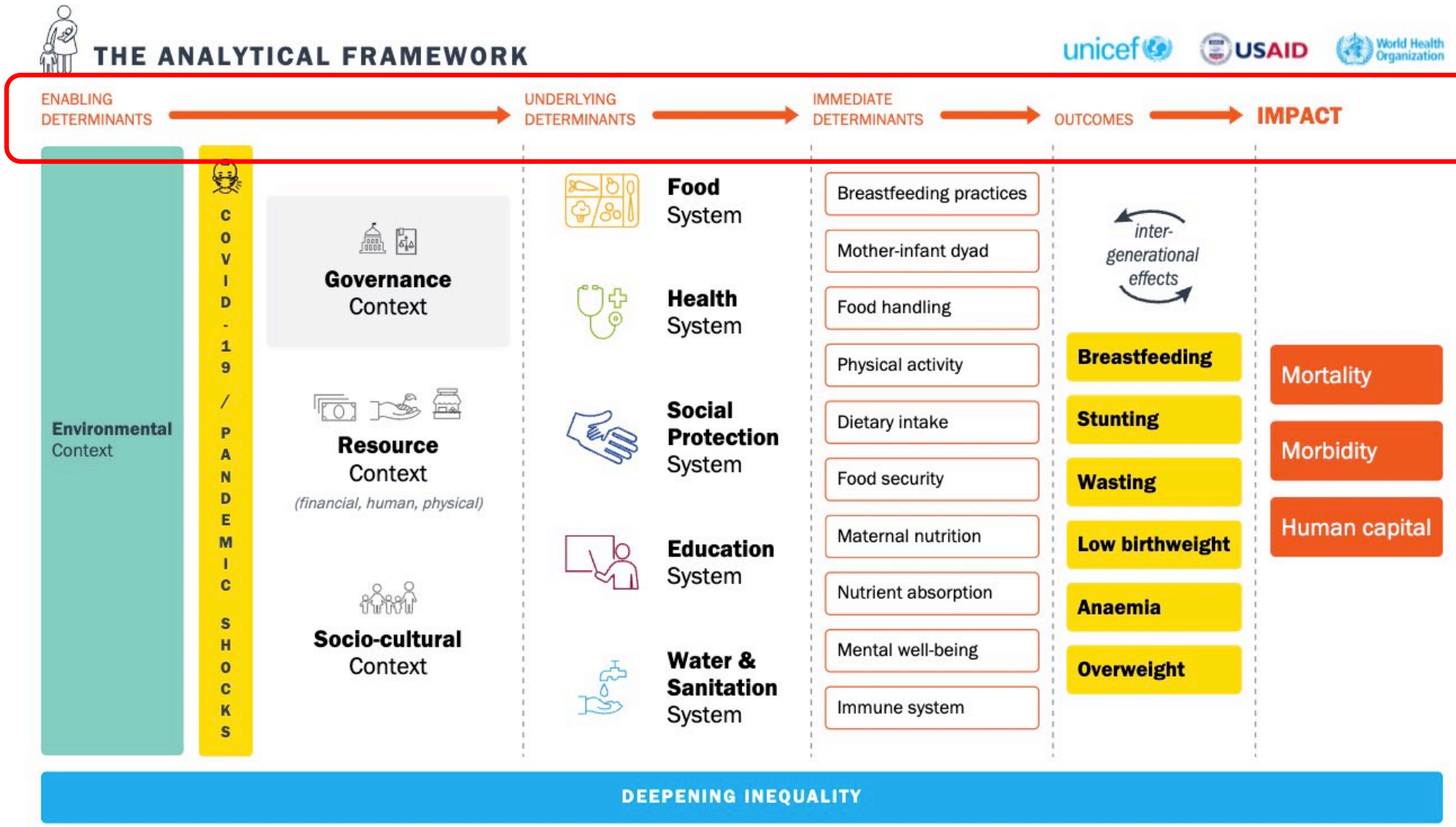
The analytical framework



https://www.advancingnutrition.org/resources/covid-19-and-nutrition-analytical-framework

Micronutrient FORUM

The analytical framework



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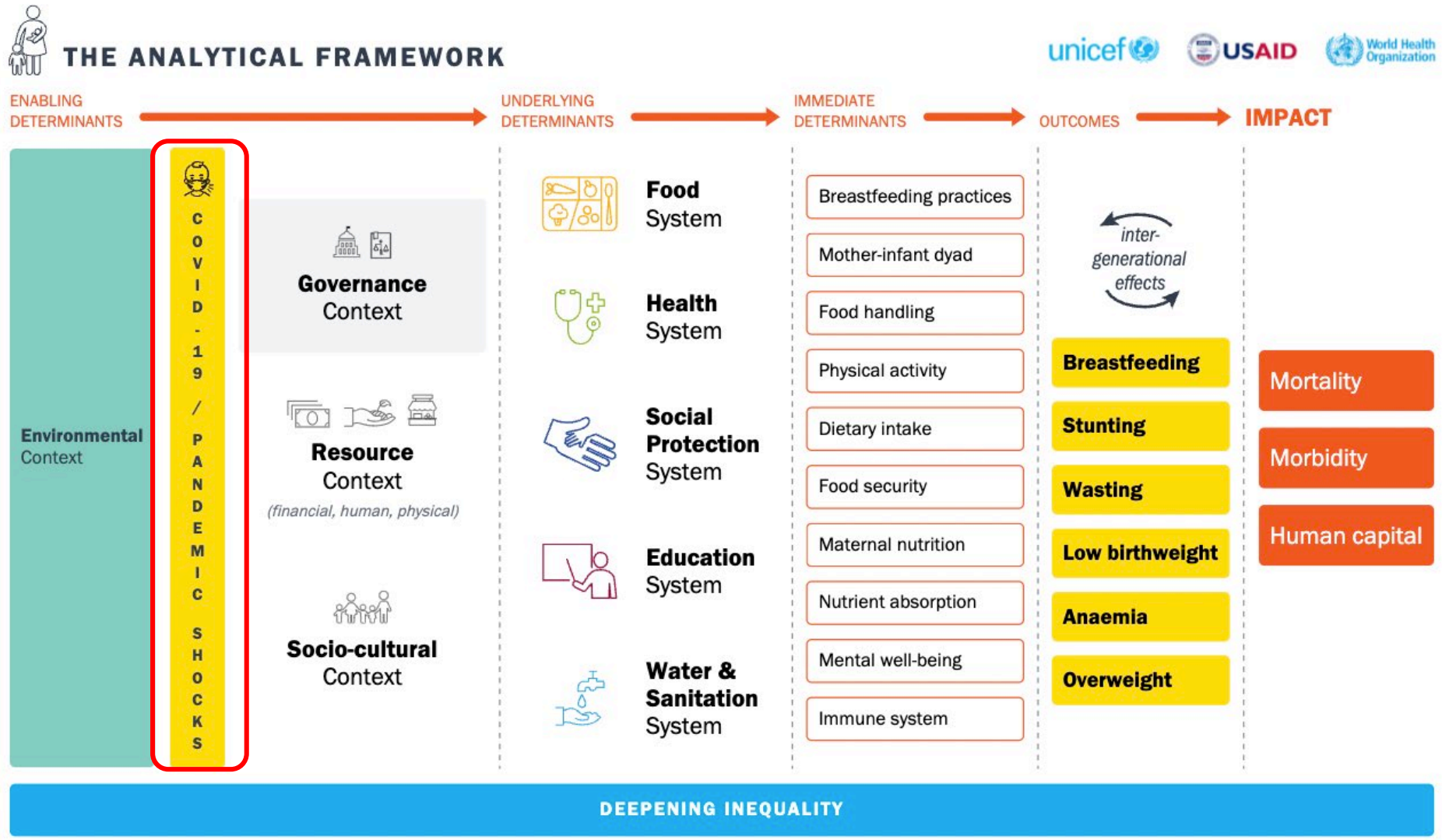
The analytical framework



https://www.advancingnutrition.org/resources/covid-19-and-nutrition-analytical-framework

Micronutrient FORUM

ENABLING DETERMINANTS

Environmental Context

Human encroachment, interaction with wildlife (zoonotic infections)

Damage to climate, biodiversity, urbanization, threat to food sustainability

Humanitarian emergencies/ Conflict

COVID-19 / PANDEMIC SHOCKS

Governance context

Stringent movement restrictions, quarantines, physical distancing policies, ↓ public mobility

↓ global trade (impact on public and private sectors), ↑ protectionist trade policies *(e.g., vaccine export bans, food export restrictions)*

↑ travel restrictions, closed national borders, ↓ air/ sea freight movement

↓ social sector investments, resource diversion to COVID-19 response

Data systems

↓ access to businesses & services (e.g., closure of banks, gyms, restaurants, open air markets)

Resource context

Financial resources

↓ global economic activity, ↑ poverty

Δ income levels, purchasing power, remittance flows

Human resources

Δ employment rates, loss of jobs/livelihoods in some sectors

Δ seasonal migrant labour, movement/displacement of people

Outbreaks among staff at work, site closures, Δ in production levels *(e.g., food plants, farms, restaurants)*

Death/illness of breadwinner/ primary caregivers of children, elderly and people with disabilities and/or special needs

Physical resources

Access to information and communications technology

↓ access to food, basic utilities *(water, electricity, telecommunications)*

Crowded household living space due to stay-at-home orders, ↑ household and caregiver stress

Socio-cultural context

Women's empowerment *(financial, educational, social)*

↓ care-seeking behaviors due to fears of infection, Δ demand/supply of services

↓ access to women's support groups and community social networks

↑ child rights violations: abuse, neglect, child labour, child marriage, early pregnancy

↑ women's workload

↑ domestic/intimate partner violence resulting in physical, mental trauma

↑ COVID-19 misinformation, disinformation, Δ access to accurate health and nutrition information

UNDERLYING DETERMINANTS

Food system

Disruption of food and agricultural supply chain, Δ food prices/price fluctuations

Δ access to and availability of nutritious, safe, affordable, sustainable foods, including fresh foods *(fruits, vegetables)*, protein *(dairy, lean meat)*, staples

↑ online food shopping & delivery services of pre-packaged foods

↑ non-adherence of food industry to evidence-based food policies, food safety standards, dietary and biofortification guidelines; non-compliance with labelling & marketing regulations *(e.g., violations to the International Code of Marketing of Breast-milk Substitutes, infant formula distribution/donations)*

↑ exposure to marketing *(including digital marketing)* of foods high in fats, sugars, salt, unhealthy commodities, including through advertisement, promotions, sponsorships

Education system

Disruption of school meal programmes due to school closures and food supply disruptions

↓ delivery of nutrition/health educational curriculum (e.g., physical education) and support services (e.g. psychosocial)

↑ school drop-outs, lost years of schooling

Health system

Interruption in the delivery and/or decrease in the quality of health services (e.g., routine immunizations, reproductive health services, maternal counselling, prevention & treatment of infections)

Interruption in the delivery and/or decrease in the quality of nutrition services (e.g., micronutrient supplementation, detection & treatment of wasting, infant and young child feeding counselling)

Health staff fears/concerns about COVID-19 infection that impact skills, performance

Δ provider knowledge, skills and capacity to implement support for infant and young child feeding

↑ strain on health care system: overwhelmed health workers, ↓ supplies *(personal protective equipment, testing kits, ventilators)*

Social protection system

↓ Availability of and access to emergency food assistance, cash assistance

Δ social safety nets provision and supplies for vulnerable/ marginalized groups *(e.g., refugees, orphans)*

Maternity workplace protections, social protection programmes for women (e.g., informal work settings)

Water and sanitation system

↓ access to clean drinking water, handwashing and sanitation facilities and supplies

↓ personal, household, community hygiene

IMMEDIATE DETERMINANTS

Breastfeeding practices, fear of breastfeeding due to perceived risk of virus transmission through breastmilk; perceived milk insufficiency due to hunger

Mother-infant dyad separation

Unsafe storage, handling, preparation of foods, poor hygiene practices

Physical exercise, sedentary lifestyle, screen time

Change in consumption patterns (diet quantity, quality, diversity)

Food insecurity and hunger

Maternal undernutrition

Poor nutrient absorption, infection, inflammation *(enteric infection, diarrhoeal disease, environmental enteropathy, helminths)*

Poor mental well-being *(e.g., stress, anxiety, depression, post-traumatic stress disorder)*

Weakened immune system; susceptibility to illness, incidence, duration, progression, and poor disease prognosis

OUTCOMES

inter-generational effects

2025 WHA Global Nutrition Targets

Breastfeeding *(exclusive, early initiation, extended duration)*

Stunting

Wasting

Low birthweight

Anaemia

Overweight

IMPACT

Mortality

Morbidity

Human capital

DEEPENING INEQUALITY

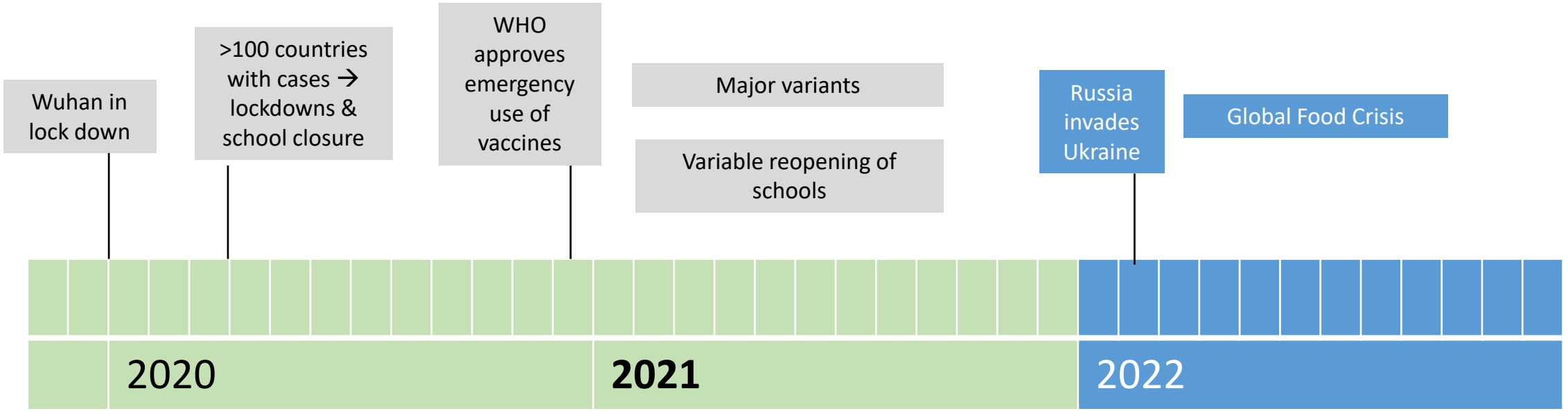
Micronutrient Forum

Nutrition in Crisis 2020-2022

Conflicts

Micronutrient FORUM

The unfolding global shocks of 2020-2022



UNITED NATIONS FOOD SYSTEMS SUMMIT 2021

TOKYO NUTRITION FOR GROWTH SUMMIT 2021
Diet, Health, & Prosperity for All

Slide Courtesy: Rebecca Heidkamp

Micronutrient FORUM

Russian war in Ukraine: a threat to global food security & nutrition

Setting the agenda in research

Comment

A malnourished child in Yemen waits with her mother for treatment at a humanitarian-aid centre.

Act now before Ukraine war plunges millions into malnutrition

Saskia Osendarp, Gerda Verburg, Zulfiqar Bhutta, Robert E. Black, Saskia de Pee, Cecilia Fabrizio, Derek Headey, Rebecca Heidkamp, David Laborde & Marie T. Ruel

Governments, donors and others must step up to protect current and future generations from the devastating effects of malnutrition, as well as to prevent acute food insecurity.

As the devastation in Ukraine continues to unfold, many of the warnings about the global food crisis precipitated by the war have focused on the risks of famine and severe food insecurity. The Food and Agriculture Organization (FAO) of the United Nations, for instance, projected last month that between 8 million and 13 million more people could become undernourished in 2022–23 – meaning that they will be unable to acquire enough food to meet the daily minimum energy requirements over one year. There are already more than 800 million undernourished people globally[1].

Another major concern is the possibility of severe price increases and disruptions to global systems for food, fertilizer and fuel, leading to millions more malnourished people in low- and middle-income countries (LMICs).

Women and children are particularly affected by the food shortages and high food prices resulting from the war against Ukraine. They are especially vulnerable to malnutrition: children's nutritional needs are high relative to their body size, and women's are high when pregnant or lactating. Furthermore,

Record high food, fuel, and fertilizer prices **threaten to further increase the number of malnourished people globally, especially women and children, in three ways**:

1. directly impacting food security and quality of the diet through increased food prices and reduced food availability and access;
2. reducing the reach of humanitarian assistance and services for mitigating acute food insecurity and preventing and treating malnutrition; and
3. reallocating nutrition budgets to other priorities

Osendarp S, Verburg G, Bhutta Z, Black RE, de Pee S, Fabrizio C, Headey D, Heidkamp R, Laborde D, Ruel MT. Act now before Ukraine war plunges millions into malnutrition. Nature. 2022 Apr;604(7907):620-624. doi: 10.1038/d41586-022-01076-5. PMID: 35449463.

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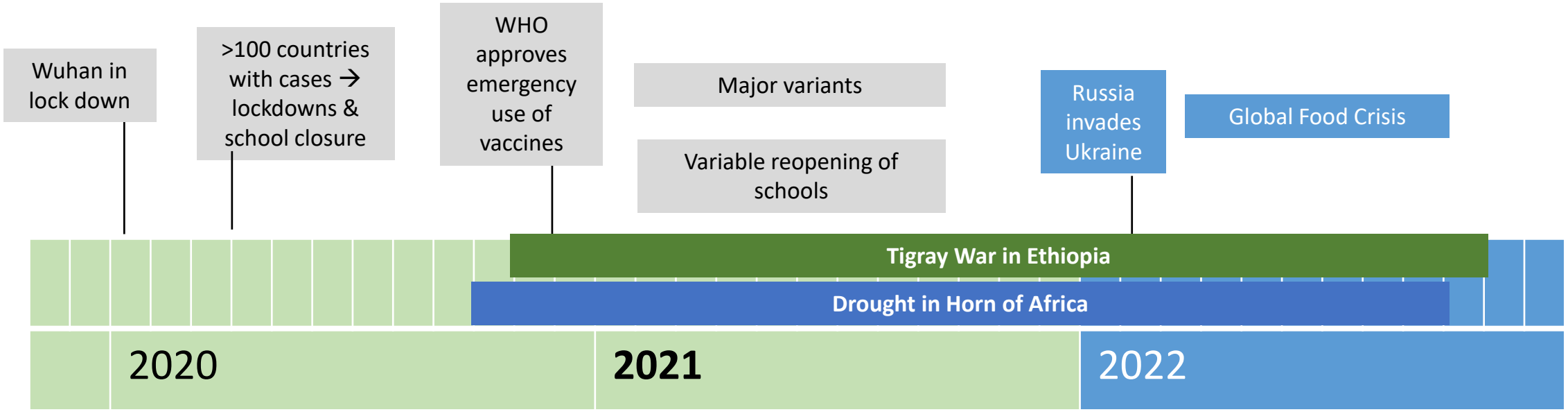
The unfolding global shocks of 2020-2022



UNITED NATIONS FOOD SYSTEMS SUMMIT 2021

TOKYO NUTRITION FOR GROWTH SUMMIT 2021
Diet, Health, & Prosperity for All

Slide Courtesy: Rebecca Heidkamp

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Nutrition in Crisis 2020-2022

Food Price Crisis

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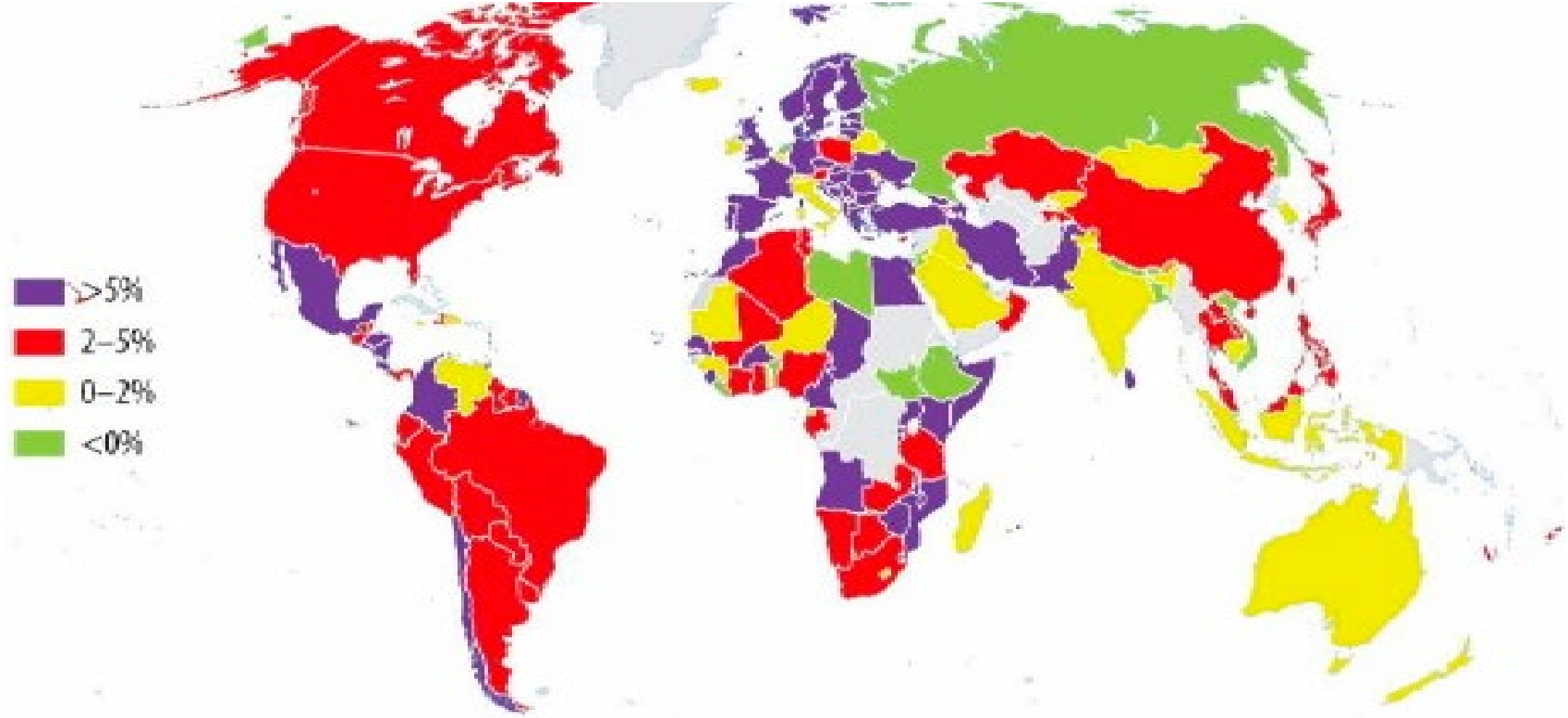
Twelve month food price inflation as per December 2022



https://thedocs.worldbank.org/en/doc/40ebbf38f5a6b68bfc11e5273e1405d4-0090012022/related/Food-Security-Update-LXXIV-December-1-2022.pdf

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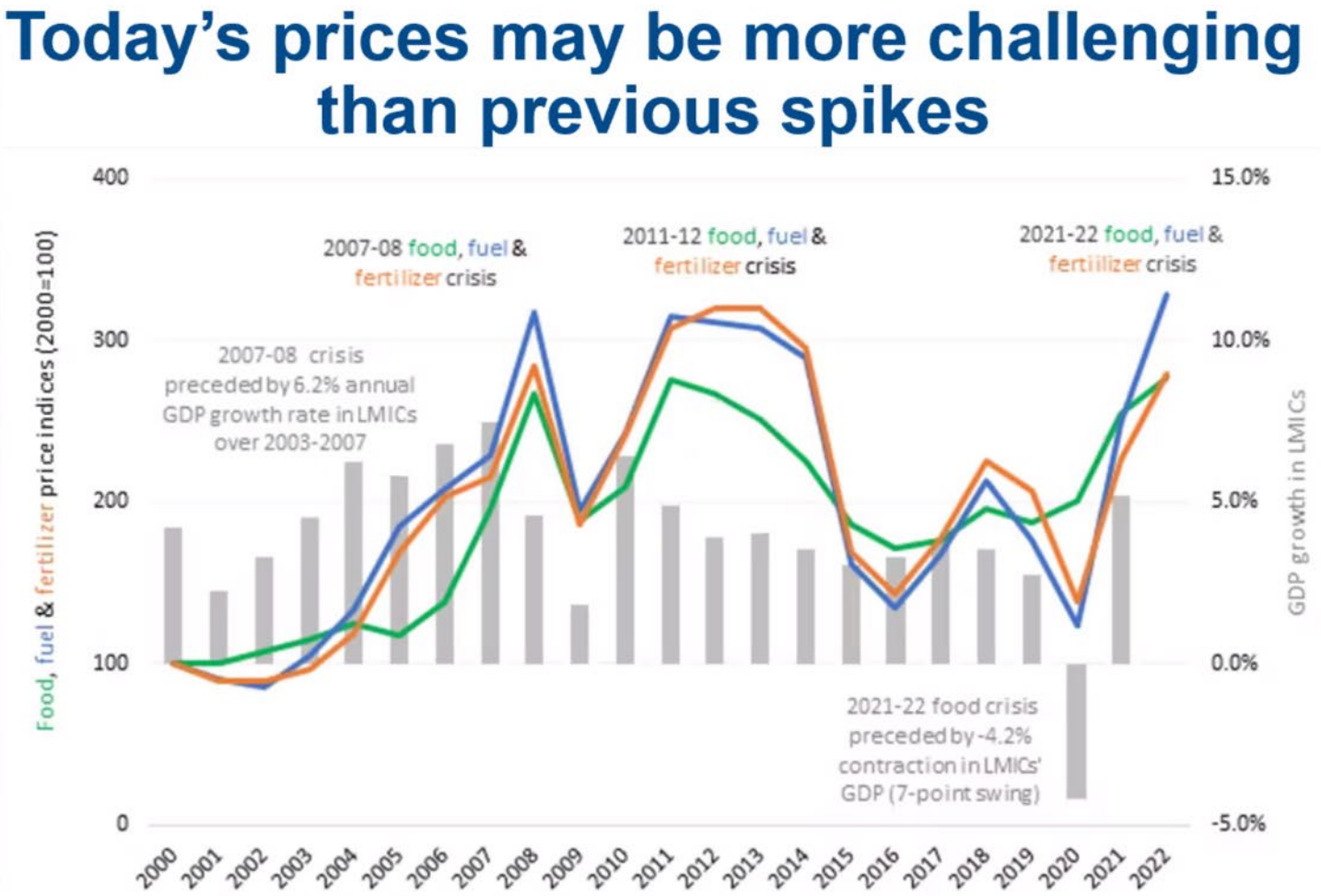
More complex food price crisis



- The poor are still **recovering from COVID** crisis
- **Hunger and malnutrition** were on the rise
- **Cash strapped governments** have little room to maneuver
- It is **unclear how long** current challenges will persist

Heady D, Ruel M. Food Inflation and Child Undernutrition in Low and Middle Income Countries. IFPRI Discussion paper 02146; 2022 https://ebrary.ifpri.org/digital/collection/p15738coll2/id/136457

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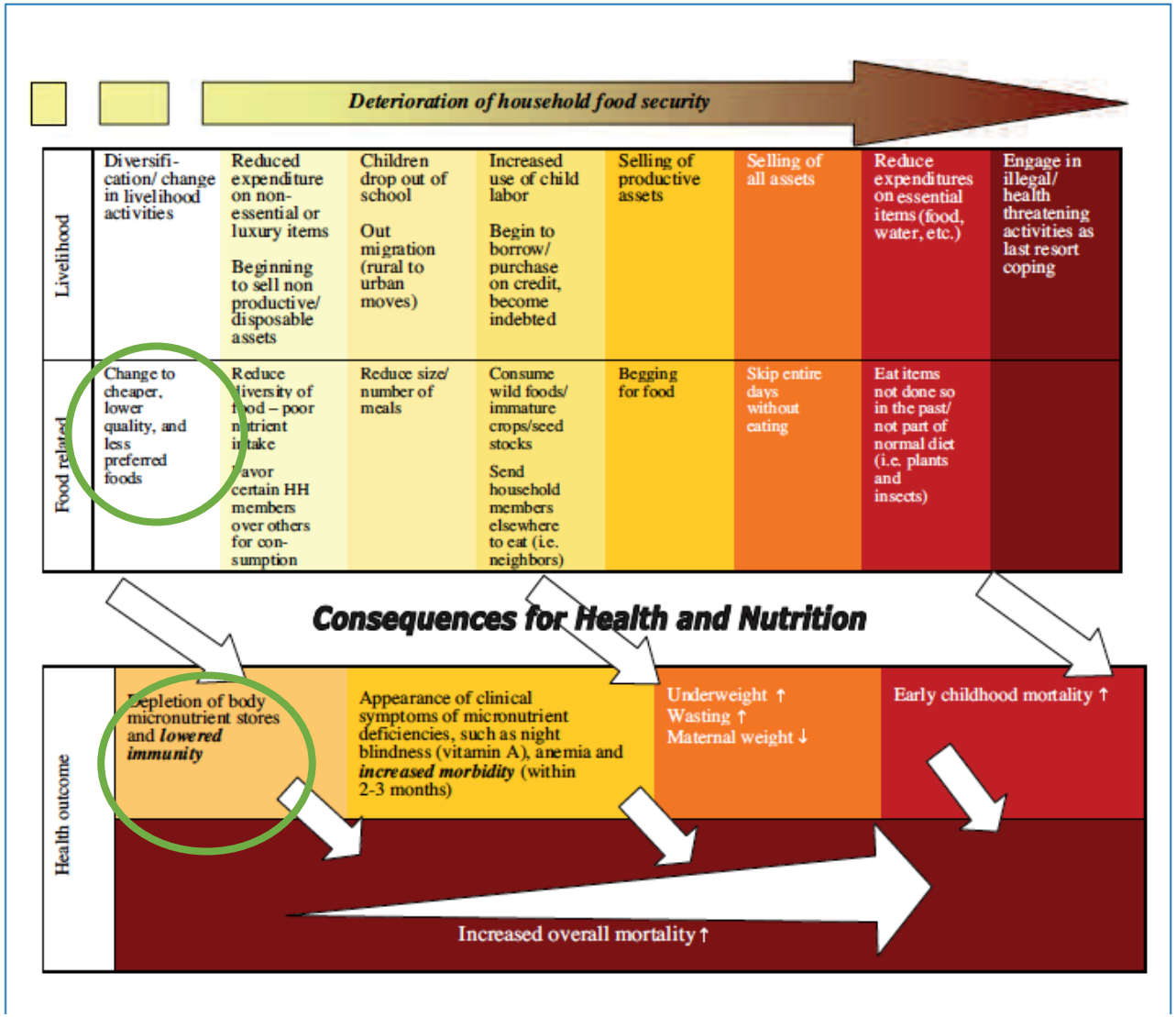
Increase in micronutrient malnutrition during an economic crisis



During an economic crisis, an **increase in micronutrient malnutrition** is expected before weight loss as households sacrifice dietary diversity

Source: Klotz et al. Nutrition in the perfect storm: why micronutrient malnutrition will be a widespread health consequence of high food prices. Sight & Life Magazine, 2/2008

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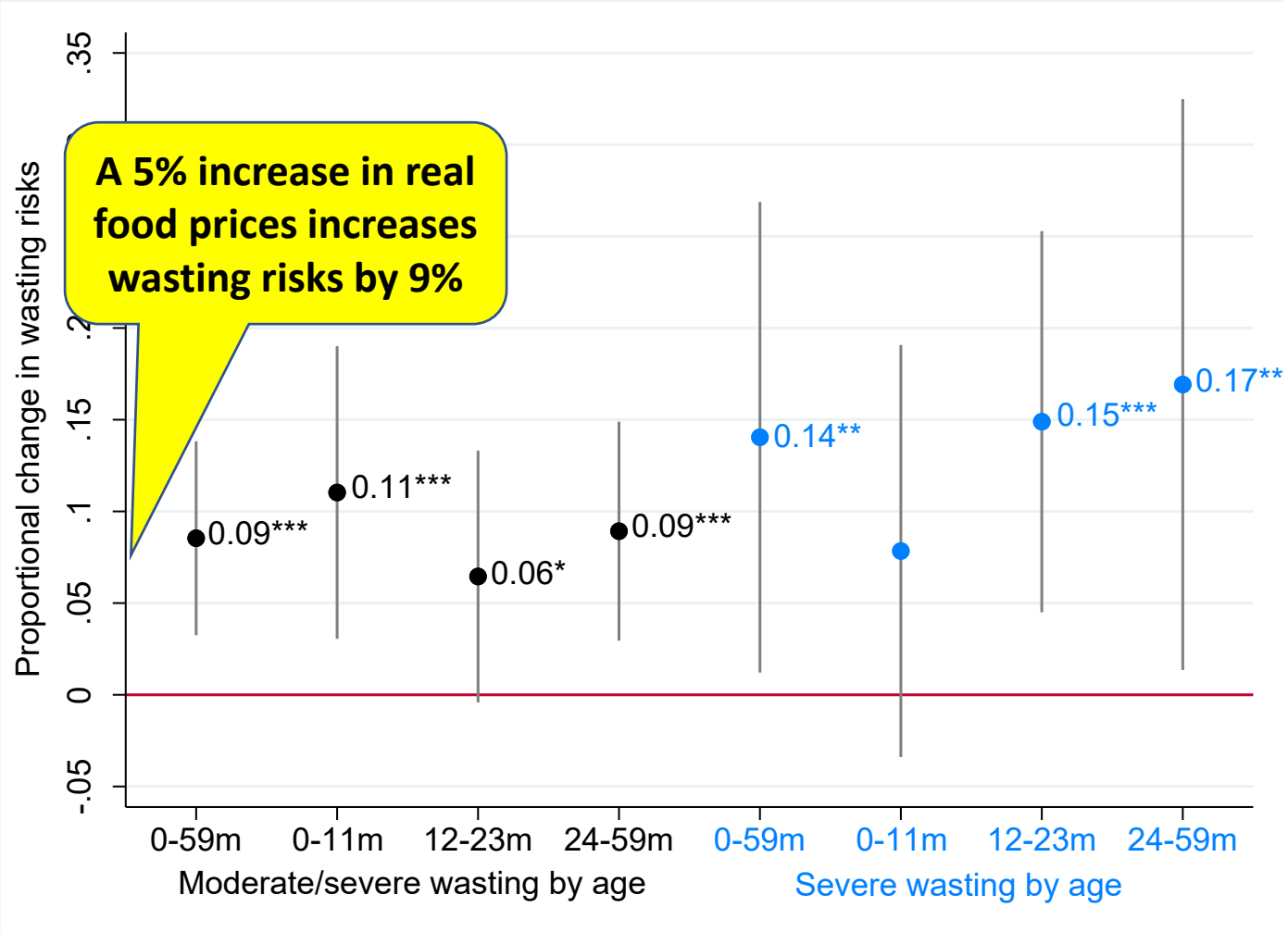
Food inflation coefficients for wasting

Proportional changes in wasting risks from a 5% food inflation in past 3 months



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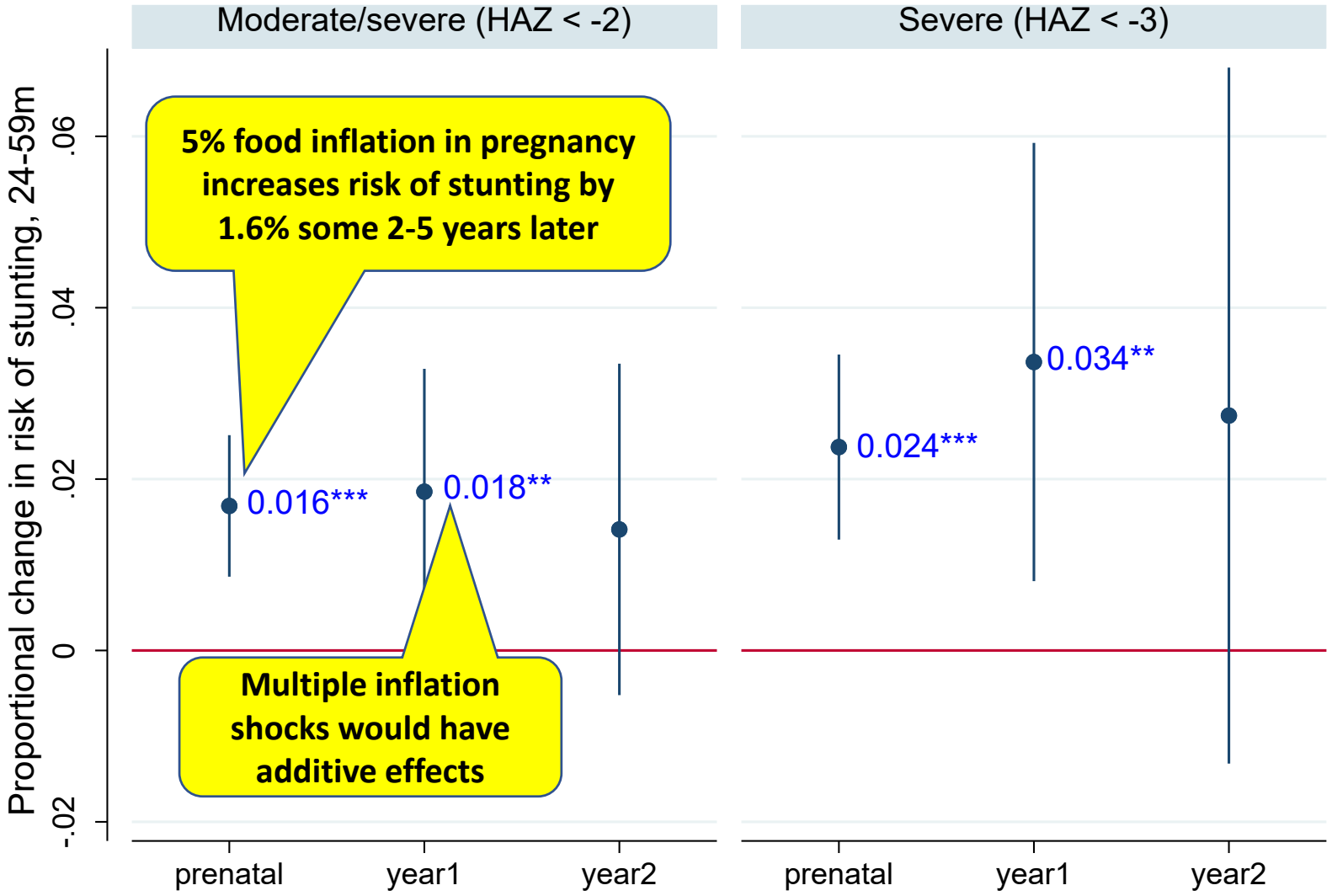
Food inflation in the first 1000 days as a risk factor for stunting among children (24-59m)



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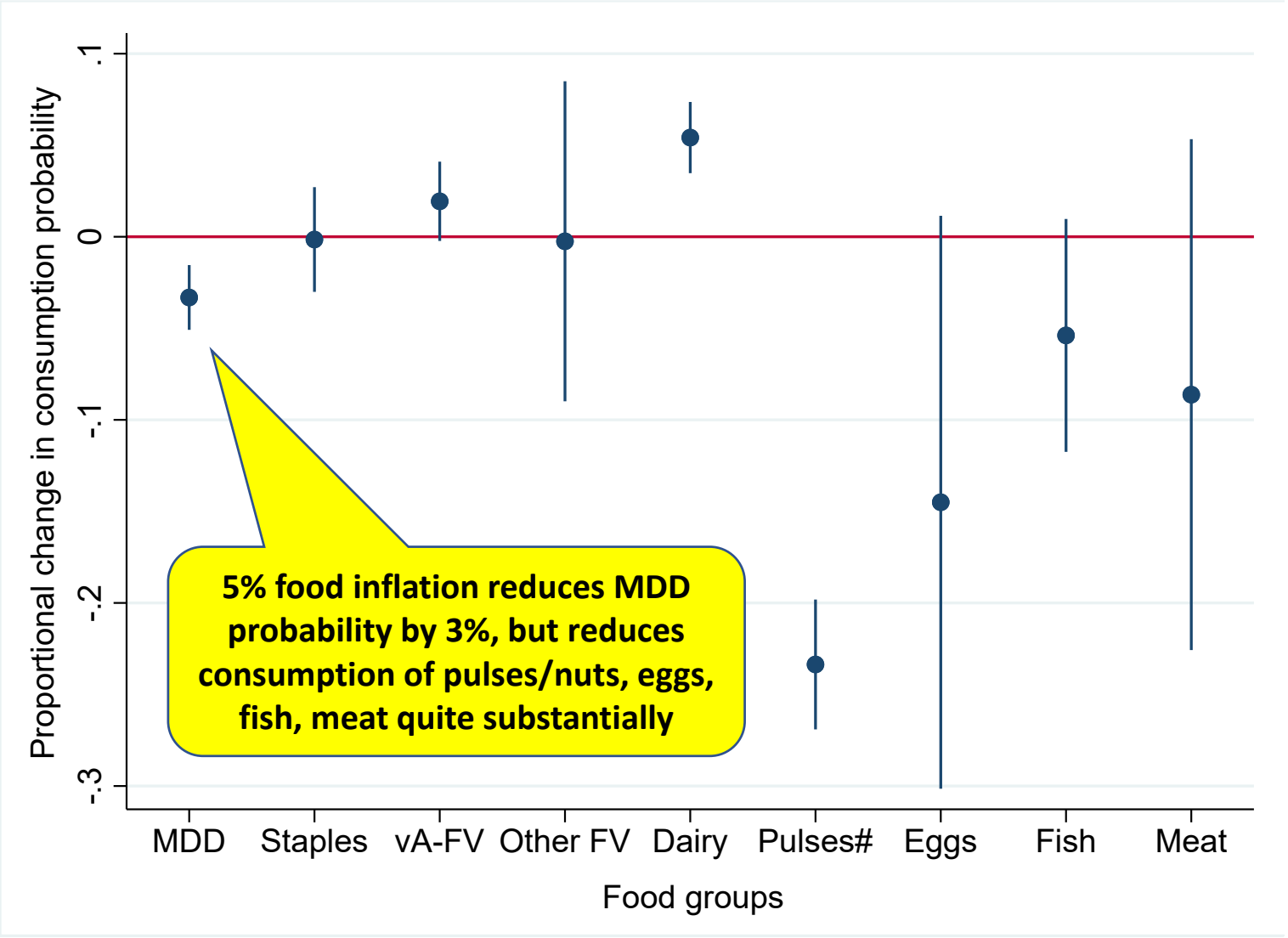
Impacts of food inflation on minimum diet diversity & children's eating different food groups



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Nutrition in Crisis 2020-2022

Science and advocacy for impact

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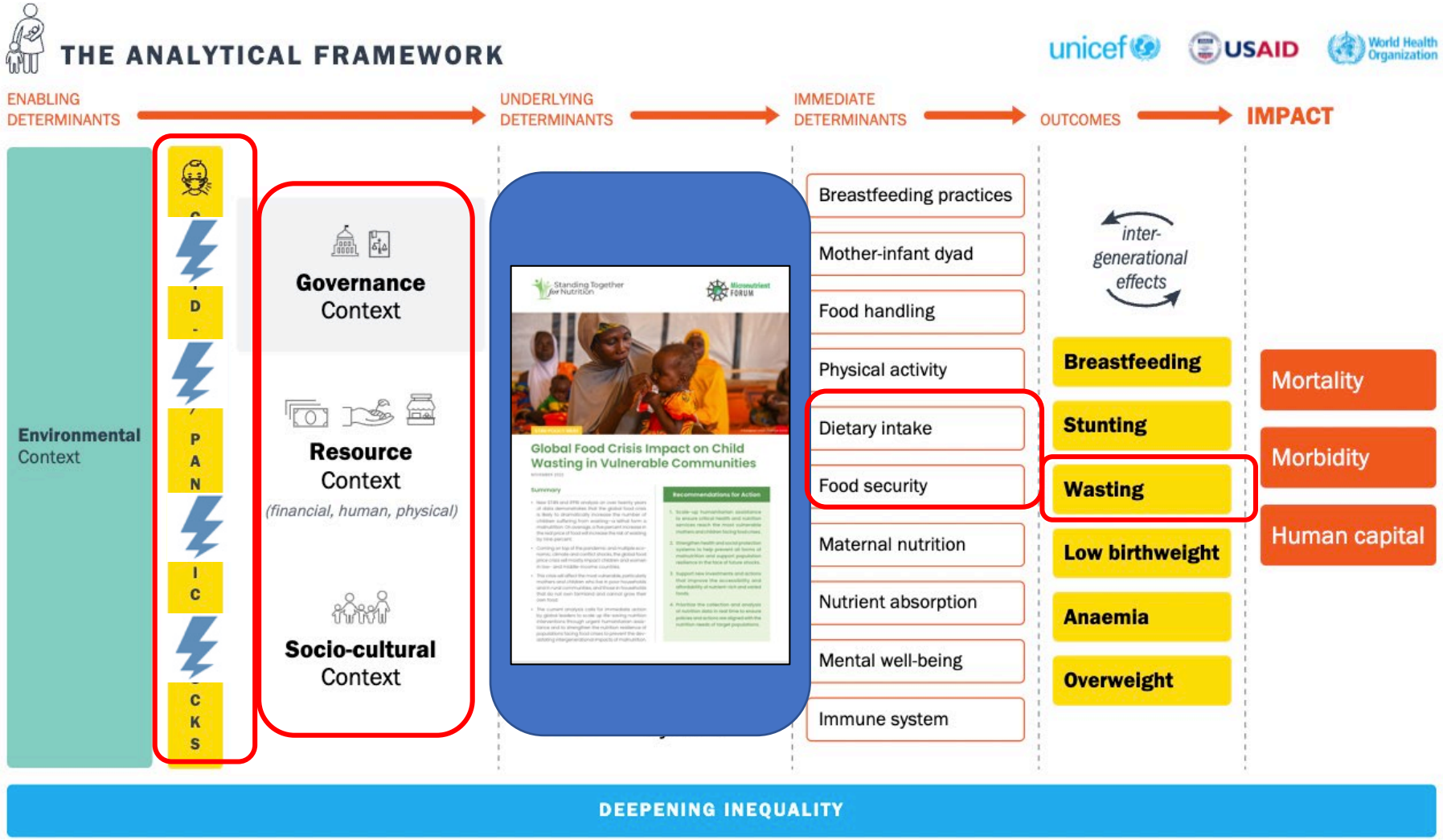

https://www.advancingnutrition.org/resources/covid-19-and-nutrition-analytical-framework

Micronutrient FORUM

Speaking with one voice: ST4N Steering Committee with experts from all global regions and backgrounds

Dr Tahmeed Ahmed, PhD
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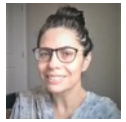

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Kerri Wazny, PhD
Associate Director, Monitoring and Evaluation, The Power of Nutrition
United Kingdom

Micronutrient FORUM

ST4N: Amplification and Advocacy created impact

Publications in high impact scientific journals

Translated into policy briefs

Amplified at high level fora and summits

Leading to $$ commitments for nutrition


ARTICLES

The COVID-19 crisis will exacerbate maternal and child undernutrition and child mortality in low- and middle-income countries


Setting the agenda in research

Comment

Act now before Ukraine war plunges millions into malnutrition

Governments, donors and others must step up to protect current and future generations from the devastating effects of malnutrition, as well as to prevent acute food insecurity.


COVID's Impact on Malnutrition

Significant funding commitments for nutrition that cited ST4N data included:

$11 billion — USAID

$920 million — Bill and Melinda Gates Foundation

$520 million — Global Affairs Canada


DECEMBER 07, 2021

Fact Sheet: Biden-Harris Administration Announces Plans for $11 Billion to End Malnutrition at Global Nutrition Summit

BRIEFING ROOM › STATEMENTS AND RELEASES

The Bill & Melinda Gates Foundation Commits $922 Million to Advance Global Nutrition to Help Women and Children

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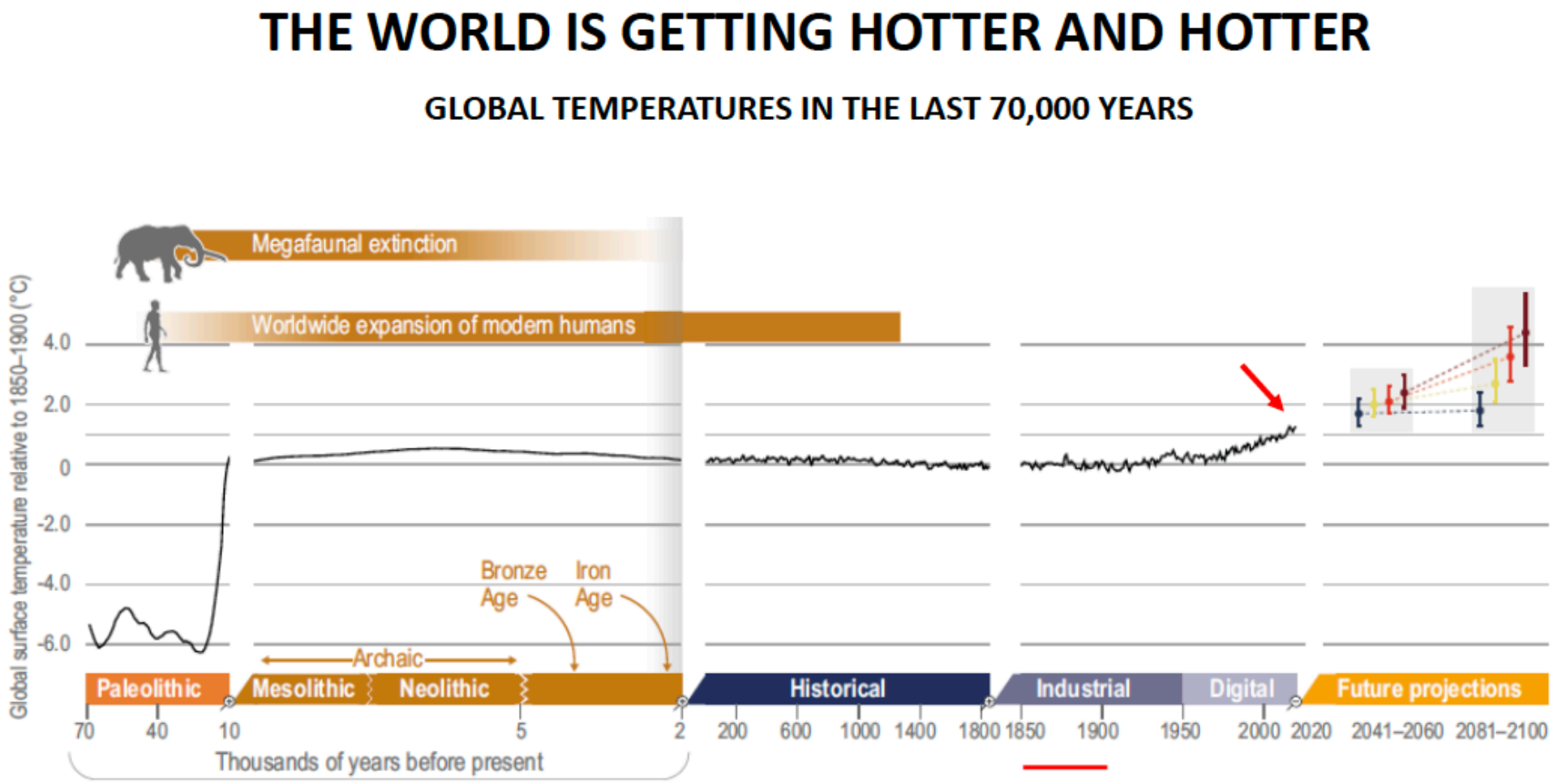
Nutrition in Crisis 2020-2022

Climate Change

Micronutrient FORUM

The world is getting hotter



IPCC. Climate Change 2022: Impact, Adaptation and Vulnerability. 2022, p 155

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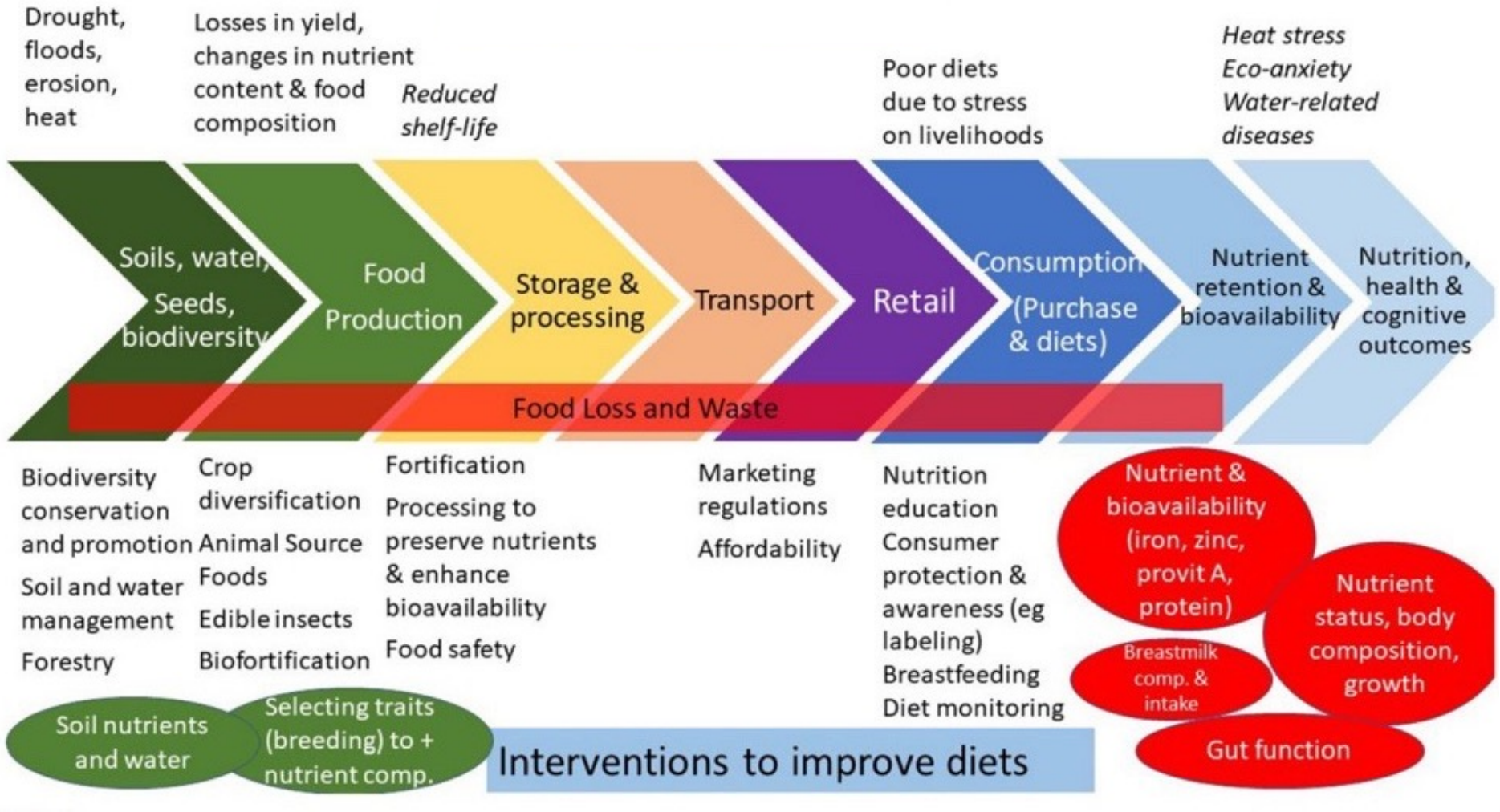
Food systems and climate change impacts

A food systems continuum and value chain schema to address the link between climate change and diet quality and identify entry opportunities for stable isotope techniques relating to soil, water, and seed biodiversity, food production, nutrient retention and bioavailability, and nutrition, health and cognitive outcomes



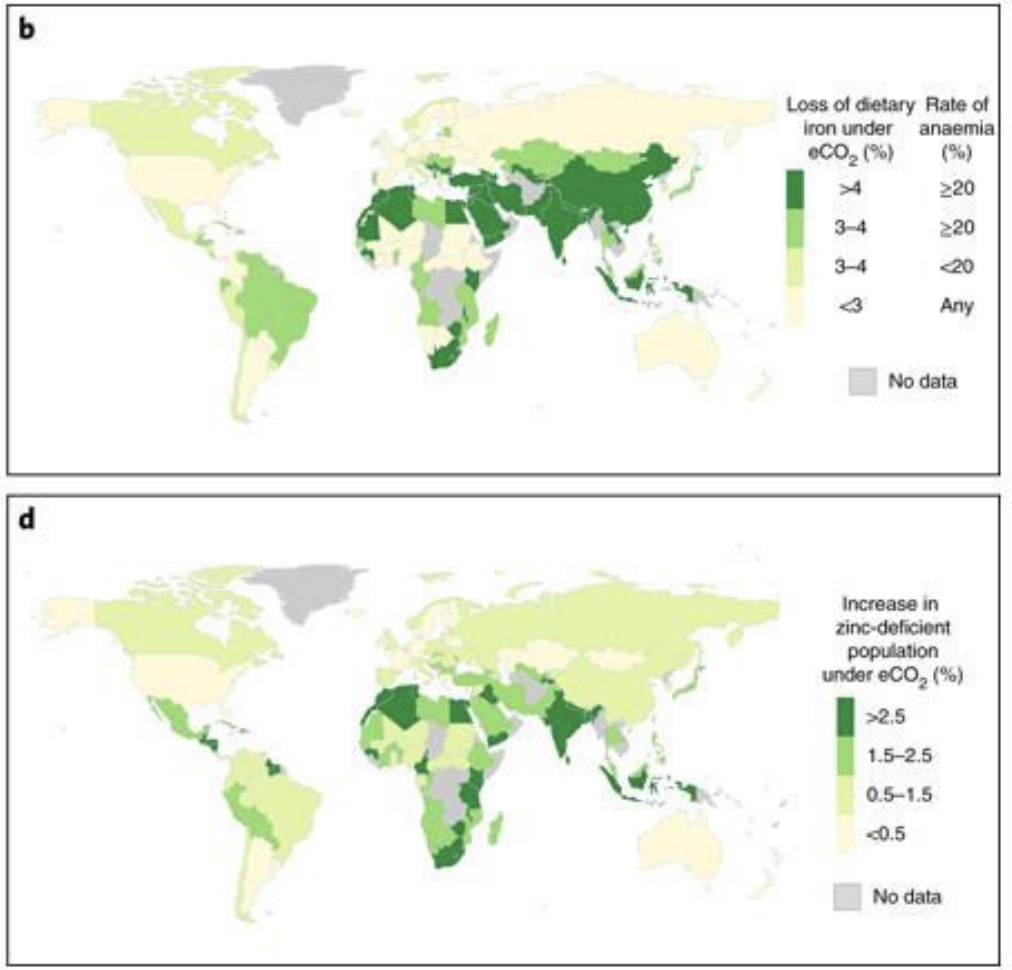
Adapted from IAEA 2022

Micronutrient FORUM

Negative impact of CO_2 emissions on nutritional quality of food crops

Rising CO_2 levels will likely cause plants to lose nutritional value

- Under rising CO_2 levels, many food crops have iron and zinc contents that are reduced by 3-17% compared with current conditions
- Elevated CO_2 could cause an additional 175 million people to be zinc deficient
- 1.4 billion women of childbearing age and children under 5 live in countries with greater than 20% of anemia prevalence and would lose >4% of dietary iron



Risk of inadequate nutrient intake from elevated atmospheric CO2 concentrations of 550 ppm. (Smith and Myers 2018).

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How would pollinator loss affect micronutrient malnutrition?

Analyzed 224 types of food in 156 countries

Model with complete loss of pollinators

↓ 23% global fruit supply
↓ 16% global vegetable supply
↓ 22% global nuts/seeds supply

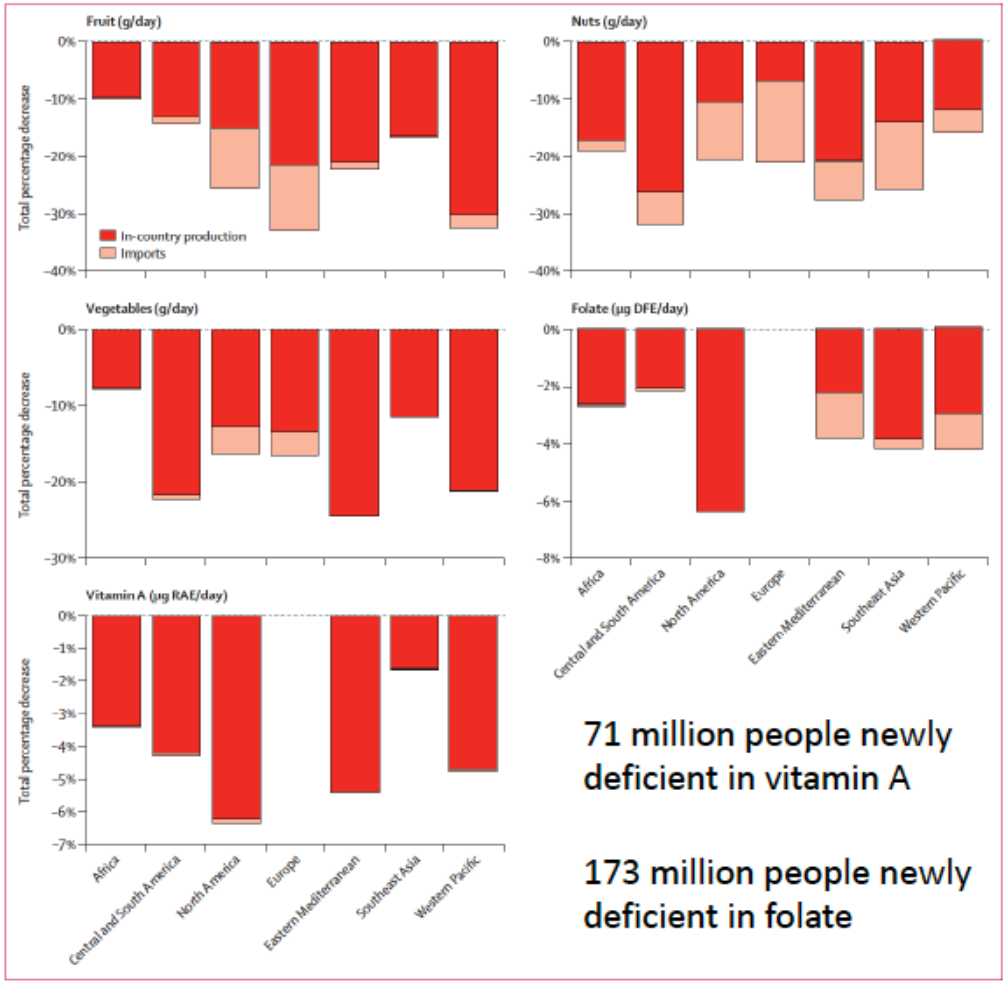

Figure 3: Decreases in food and nutritional intake with full pollinator removal
RAE=retinol activity equivalent. DFE=dietary folate equivalent.

Smith MR et al. Lancet 2015;386:1964-72; Slide courtesy: Richard Semba

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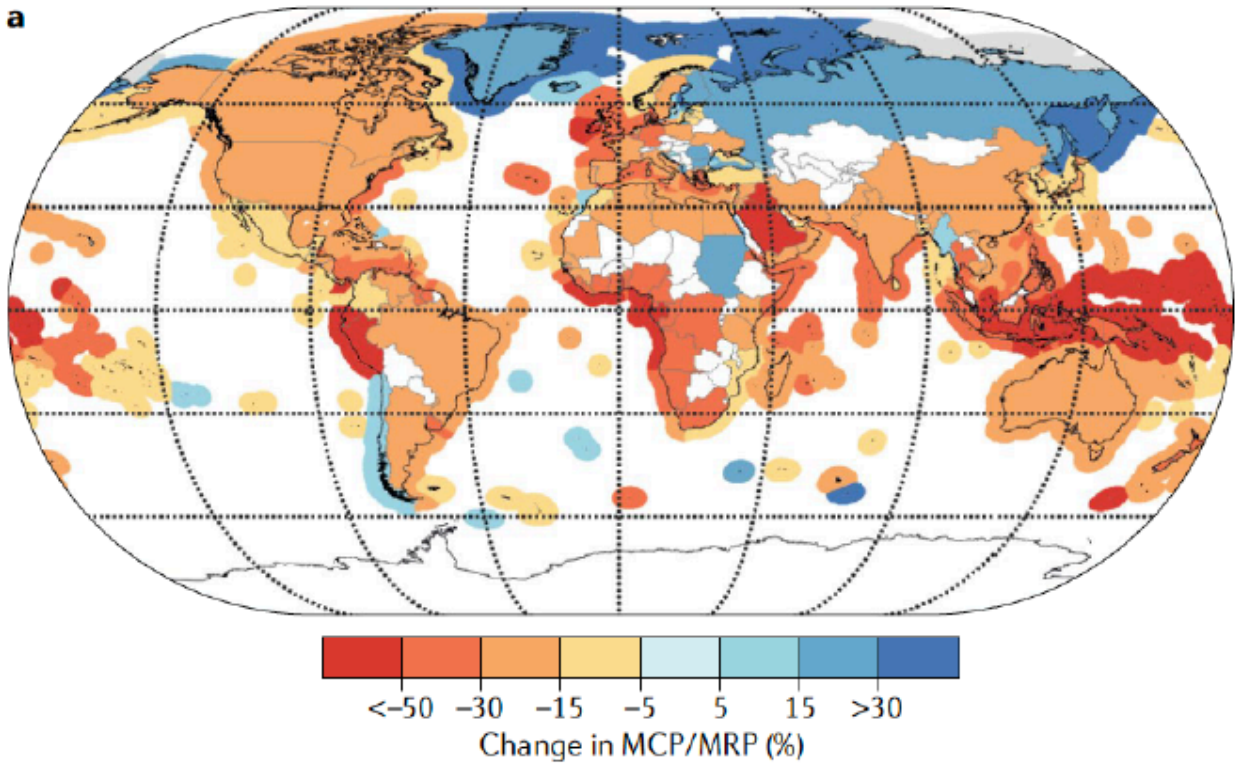
Micronutrient FORUM

Climate change is reducing fisheries catch



Change in maximum catch potential (MCP) and maximum revenue potential (MRP) in 2041-2060 compared with 1991-2010 under RCP 8.5

- Ocean warming
- Hypoxia
- Destruction of coral reefs
- Loss of mangrove forests
- Poleward shift of fish species

Slide courtesy: Richard Semba

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How climate change threatens micronutrient status

Climate change– higher temperatures, atmospheric carbon dioxide, and ground-level ozone, among other factors–**will reduce the nutrient value of many nutritious crops** as well as staple crops and animal source foods.

An increasing number of **extreme weather events**– including droughts, floods, heat waves, and storms–**are reducing yields and pushing down food production.**

Climate change is decreasing the number and diversity of pollinators, which are essential for production of nutritious foods like fruits, vegetables, nuts, and seeds.

Rising sea levels will threaten agricultural land coastal zone. and reduce rice production in the low-elevation

Ocean and freshwater warming, ocean hypoxia, destruction of coral reefs, and loss of mangrove forests **are reducing ocean and inland fisheries catch.**

Climate change-induced rises in the prevalence of waterborne diseases and other health conditions will **increase the micronutrient needs of individuals.**

Adapted from Semba RD et al. Adv Nutr 2022; 13: 80-100

Micronutrient FORUM

Integrated interventions are required

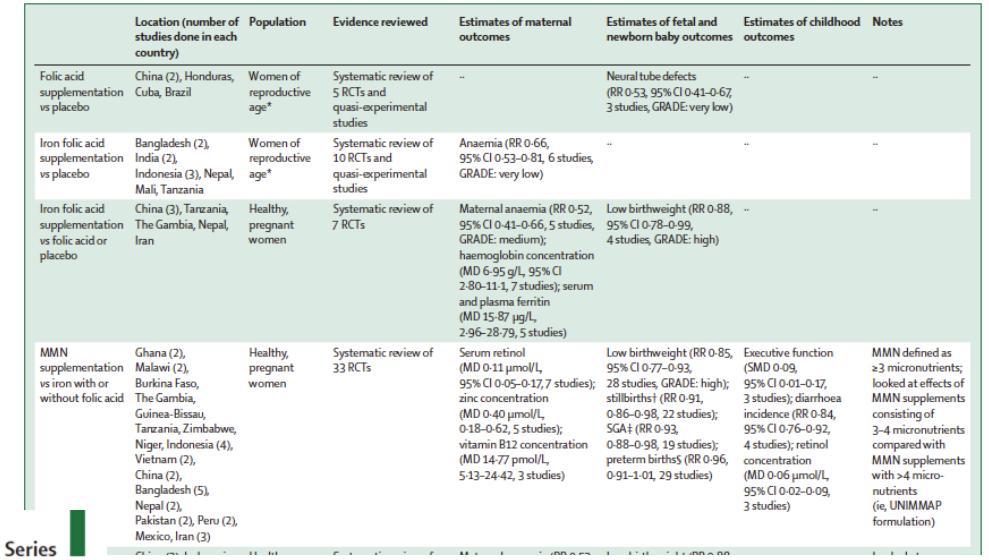
Micronutrient FORUM

Strong evidence base on effectiveness of interventions to address maternal and child malnutrition

2008

2013

2021



	Location (number of studies done in each country)	Population	Evidence reviewed	Estimates of maternal outcomes	Estimates of fetal and newborn baby outcomes	Estimates of childhood outcomes	Notes
Folic acid supplementation vs placebo	China (2), Honduras, Cuba, Brazil	Women of reproductive age*	Systematic review of 5 RCTs and quasi-experimental studies	..	Neural tube defects (RR 0·53, 95% CI 0·41–0·67, 3 studies, GRADE: very low)	..	..
Iron folic acid supplementation vs placebo	Bangladesh (2), India (2), Indonesia (3), Nepal, Mali, Tanzania	Women of reproductive age*	Systematic review of 10 RCTs and quasi-experimental studies	Anaemia (RR 0·66, 95% CI 0·53–0·81, 6 studies, GRADE: very low)	..	..	..
Iron folic acid supplementation vs folic acid or placebo	China (3), Tanzania, The Gambia, Nepal, Iran	Healthy, pregnant women	Systematic review of 7 RCTs	Maternal anaemia (RR 0·52, 95% CI 0·41–0·66, 5 studies, GRADE: medium); haemoglobin concentration (MD 6·95 g/L, 95% CI 2·80–11·1, 7 studies); serum and plasma ferritin (MD 15·87 µg/L, 2·96–28·79, 5 studies)	Low birthweight (RR 0·88, 95% CI 0·78–0·99, 4 studies, GRADE: high)	..	..
MMN supplementation vs iron with or without folic acid	Ghana (2), Malawi (2), Burkina Faso, The Gambia, Guinea-Bissau, Tanzania, Zimbabwe, Niger, Indonesia (4), Vietnam (2), China (2), Bangladesh (5), Nepal (2), Pakistan (2), Peru (2), Mexico, Iran (3)	Healthy, pregnant women	Systematic review of 33 RCTs	Serum retinol (MD 0·11 µmol/L, 95% CI 0·05–0·17, 7 studies); zinc concentration (MD 0·40 µmol/L, 0·18–0·62, 5 studies); vitamin B12 concentration (MD 14·77 pmol/L, 5·13–24·42, 3 studies)	Low birthweight (RR 0·85, 95% CI 0·77–0·93, 28 studies, GRADE: high); stillbirths† (RR 0·91, 0·86–0·98, 22 studies); SGA‡ (RR 0·93, 0·88–0·98, 19 studies); preterm births§ (RR 0·96, 0·91–1·01, 29 studies)	Executive function (SMD 0·09, 95% CI 0·01–0·17, 3 studies); diarrhoea incidence (RR 0·84, 95% CI 0·76–0·92, 4 studies); retinol concentration (MD 0·06 µmol/L, 95% CI 0·02–0·09, 3 studies)	MMN defined as ≥3 micronutrients; looked at effects of MMN supplements consisting of 3–4 micronutrients compared with MMN supplements with >4 micronutrients (ie, UNIMMAP formulation)

Series

The Lancet Series on Maternal and Child Undernutrition Progress

Three Lancet Series on maternal and child mal/undernutrition provided consensus on the scale of the problem and the effective interventions

Micronutrient FORUM

The ”what” is known

Nutrition interventions delivered withi and outside the health sector a equally crucial for preventing and managing malnutrition.

The Lancet Serie

Strong evidence for implementation	• Multiple micronutrient supplementation in pregnancy • Kangaroo mother care for preterm and low birthweight newborn babies • Delayed cord clamping for preterm newborn babies • Breastfeeding promotion and counselling • Complementary feeding education with food provision in food insecure populations • Vitamin A supplementation for children in vitamin A-deficient contexts • Therapeutic zinc supplementation for diarrhoea management • Small-quantity lipid-based nutrient supplements for growth among children • Ready-to-use supplementary food for management of acute malnutrition • Family planning and birth spacing* • Insecticide-treated bednets for the control of malaria* • Large-scale food fortification for the prevention of micronutrient deficiencies†
Moderate evidence for implementation	• Water, sanitation, and hygiene interventions‡ • Calcium supplementation in pregnancy in low intake populations • Balanced-energy protein supplementation in pregnancy for women who are undernourished • Complementary feeding education without food provision in food secure populations • Preventive zinc supplementation to reduce diarrhoea incidence • Micronutrient powders to reduce iron deficiency and anaemia among children
Weak evidence for implementation	• Food distribution programmes during pregnancy • Kangaroo mother care for term newborn babies
Emerging evidence	• Probiotics for preterm and low birthweight newborns • Emollient use (ie, coconut oil) for preterm and low birthweight newborns

d interventions for improving maternal and
continue to be a combination of
hat are direct and indirect.

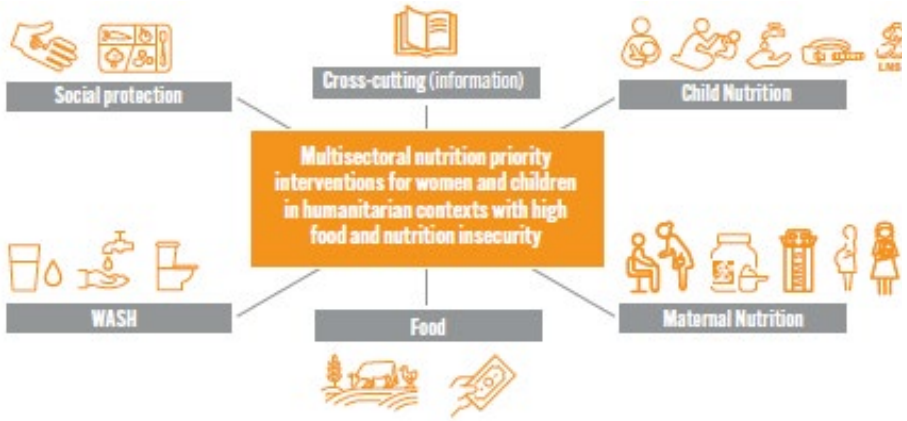
erventions delivered within and outside
e sector are equally crucial for preventing
malnutrition.

supports the use of preventive lipid-based
ementation for reducing childhood
ng, and underweight, and the use of
iple micronutrient supplementation for
erse pregnancy and birth outcomes.

remain for strategies to address
mong schoolchildren and adolescents.

undernutrition are diverse, and novel
esis methods underscore the need for
multisectoral action and coordination.

Priority actions from the Global Action Plan on wasting



Cross-cutting (information)	1. Enhanced analysis of the determinants of child wasting (Integrated Phase Classification (IPC) of Acute malnutrition; Food, Nutrition and Vulnerability Analyses; Fill the Nutrient Gap and Cost of the Diet tools; Standardized and Expanded Nutrition Surveys; SMART Nutrition Surveys; Food and Nutrition Security Joint Assessment Mission) and emergency preparedness, early warning and nutrition surveillance and linkages with health surveillance.
Child Nutrition	1. Adequate breastfeeding- early initiation within one hour of birth; exclusive breastfeeding for infants aged 0–5 months; and continued breastfeeding for children up to 2 years and beyond. 2. Age-appropriate, diverse complementary foods, including specialized nutritious food supplements when appropriate and necessary (e.g., lipid-based nutrient supplements, fortified blended foods) for at-risk children. 3. Adequate health promotion and education to ensure healthy hygiene and care practices, including prevention of common morbidities such as diarrhoea, pneumonia and malaria and when to access health services for treatment of these – as well as the provision of these essential services and associated supplies. 4. Adequate psychosocial services for both mothers/primary caregivers and children with support for ongoing good practices at home to ensure positive mental health as well as growth and development. 5. Micronutrient supplements, deworming prophylaxis, and home-based fortification where dietary diversity is limited and nutrient deficiencies and anaemia prevalent. 6. Early detection and treatment of child wasting for children aged 0–59 months through community-based programmes and simplified approaches (e.g., Family MUAC approach, expanded criteria, treatment by community health workers, etc.). Improved inpatient management of children with wasting and medical complications to improve survival and sustain recovery.
Maternal Nutrition	1. Counselling on maternal nutrition and monitoring healthy weight gain during pregnancy, with balanced energy-protein supplements for pregnant and lactating women and adolescent girls in undernourished populations. 2. Multiple micronutrient supplements/iron folate supplements, deworming prophylaxis, and malaria control for the prevention of micronutrient deficiencies and anaemia during pregnancy.
Food	1. Resilience package for producer households with at-risk children and pregnant and lactating women and adolescent girls, considering small-scale farming and home gardening (primarily for consumption); small animal husbandry (inclusion of provision of feeds); food and nutrition education and food safety measures (including food handling, storage and minimal processing); cash and vouchers. 2. Targeted and prioritized food assistance to households with vulnerable groups including at-risk children and pregnant and lactating women and adolescent girls.
WASH	1. Joint nutrition and WASH programming to increase access to safe water and sanitation for nutritionally vulnerable populations.
Social protection	1. Social assistance actions for nutritionally vulnerable households with pregnant or lactating women and/or children under 2 years of age including children recovering from acute malnutrition treatment programme.

UN Global Action Plan on Child Wasting 2023:
https://www.unicef.org/media/133236/file/UN%20GAP%20Call%20to%20Action%20.pdf

Micronutrient FORUM

Cost-effective micronutrient interventions

Dietary Diversity

How and what food we prepare has an effect on nutritional status. Eating a varied diet increases your chance of acquiring all your essential micronutrients and reduces the risk of acute infections and chronic ailments

Supplementation

Supplementation with single nutrients (such as vitamin A supplementation in children under five) or multiple micronutrients (such as multiple micronutrient supplements (MMS) for pregnant women) are important interventions to ensure adequate nutrient intakes during times in life when needs are high.

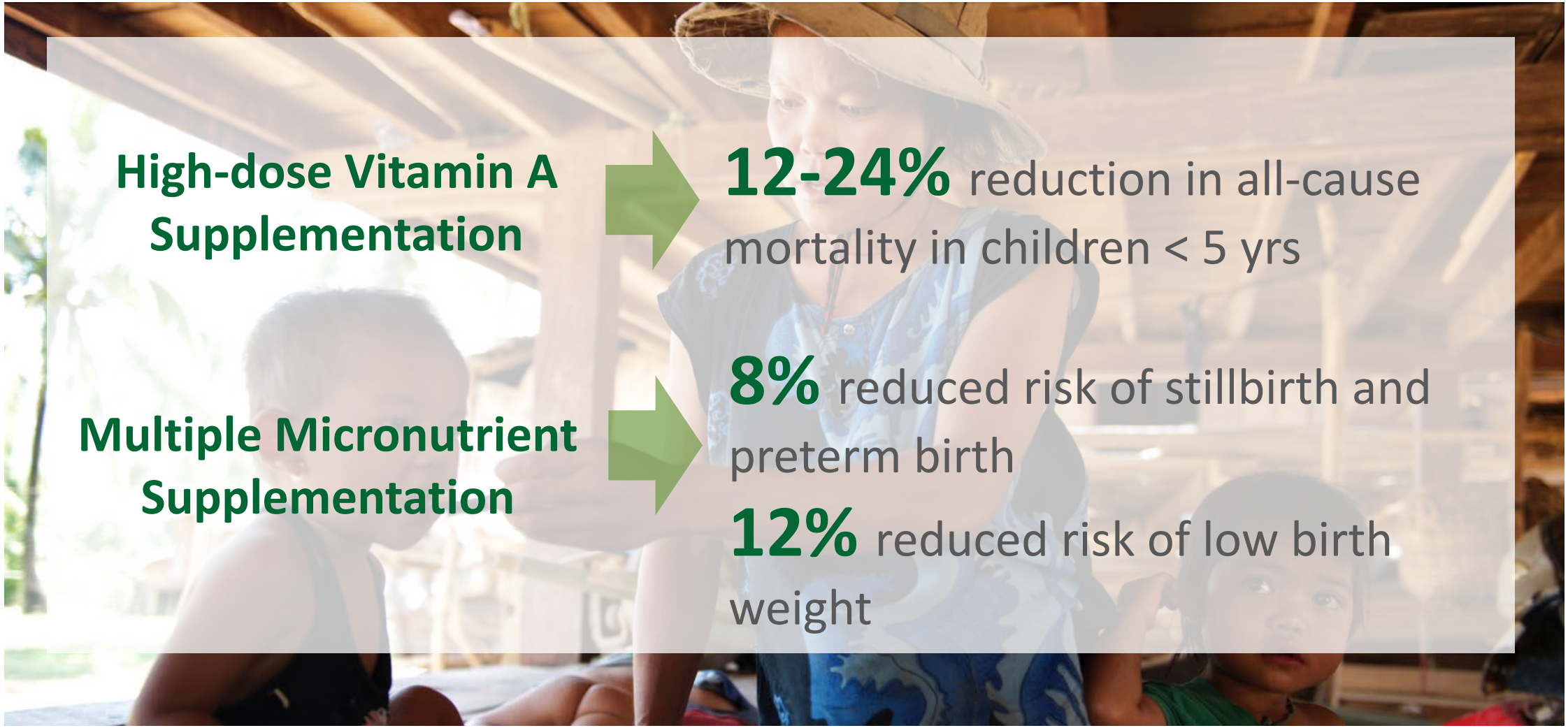
Large-scale Food Fortification and Home Fortification

Large-scale fortification improves the nutrition of entire populations. Home fortification with micronutrient powders (MNPs) aims to ensure that the diet, i.e., complementary foods and breast milk combined meets the nutrient needs of young children. MNPs are single serving sachets used in home cooking to add micronutrients when foods are ready to eat.

Agricultural and Biofortification

Agriculture delivers micronutrients into the food system through healthy soils. Healthy choices at markets and grocery stores and making biofortified staple foods available can increase a community's nutritional status.

Supplementation



High-dose Vitamin A Supplementation

12-24% reduction in all-cause mortality in children < 5 yrs

Multiple Micronutrient Supplementation

8% reduced risk of stillbirth and preterm birth

12% reduced risk of low birth weight

Keats EC, Haider BA, Tam E, Bhutta ZA. Multiple-micronutrient supplementation for women during pregnancy. Cochrane Database of Systematic Reviews 2019, Issue 3. Art. No.: CD004905. DOI: 10.1002/14651858.CD004905.pub6. Imdad A, Mayo-Wilson E, Herzer K, Bhutta ZA. Vitamin A supplementation for preventing morbidity and mortality in children from six months to five years of age. Cochrane Database Syst Rev. 2017 Mar 11;3(3):CD008524. doi: 10.1002/14651858.CD008524.pub3.

Micronutrient FORUM

Large-scale food fortification

34% Anemia

74% Odds of Goiter

41% Odds of NTD

3M Children – VAD

Keats EC, Neufeld LM, Garrett GS, Mbuya MNN, Bhutta ZA. Improved micronutrient status and health outcomes in low- and middle-income countries following large-scale fortification: evidence from a systematic review and meta-analysis. Am J Clin Nutr. 2019 Jun 1;109(6):1696-1708. doi: 10.1093/ajcn/nqz023. PMID: 30997493; PMCID: PMC6537942.

Micronutrient FORUM

The ”How” remains a challenge

Effective interventions to address maternal and child malnutrition: an update of the evidence

Emily C Keats, Jai K Das*, Rehana A Salam, Zohra S Lassi, Aamer Imdad, Robert E Black, Zulfiqar A Bhutta*

Malnutrition—consisting of undernutrition, overweight and obesity, and micronutrient deficiencies—continues to afflict millions of women and children, particularly in low-income and middle-income countries (LMICs). Since the 2013 *Lancet* Series on maternal and child nutrition, evidence on the ten recommended interventions has increased, along with evidence of newer interventions. Evidence on the effectiveness of antenatal multiple micronutrient supplementation in reducing the risk of stillbirths, low birthweight, and babies born small-for-gestational age has strengthened. Evidence continues to support the provision of supplementary food in food-insecure settings and community-based approaches with the use of locally produced supplementary and therapeutic food to manage children with acute malnutrition. Some emerging interventions, such as preventive small-quantity lipid-based nutrient supplements for children aged 6–23 months, have shown positive effects on child growth. For the prevention and management of childhood obesity, integrated interventions (eg, diet, exercise, and behavioural therapy) are most effective, although there is little evidence from LMICs. Lastly, indirect nutrition strategies, such as [illegible] nutrition, preconception care, water, sanitation, and hygiene promotion, delivered inside and outside the health-care sector also provide important nutritional benefits. Looking forward, greater effort is required to improve intervention coverage, especially for the most vulnerable, and there is a crucial need to address the growing double burden of malnutrition (undernutrition, and overweight and obesity) in LMICs.

Lancet Child Adolesc Health 2021; 5: 367–84

Published Online March 7, 2021 https://doi.org/10.1016/S2352-4642(20)30274-1

See Series *Lancet* 2021; **397**: 1388–99 and *Lancet* 2021; **397**: 1400–18

*Joint first authors

Looking forward, greater effort is required to improve intervention coverage, especially for the most vulnerable, and there is a crucial need to address the growing double burden of malnutrition (undernutrition, and overweight and obesity) in LMICs.

Maternal and child undernutrition: progress hinges on supporting women and more implementation research

Maternal and child undernutrition is a pervasive problem that has grown during the COVID-19 pandemic. Rising food prices combined with disruptions to livelihoods have put millions of people at greater risk of food and nutrition insecurity.[1] These impacts are especially pronounced in low-income and middle-income countries (LMICs), where existing health system infrastructure is weak and access to life-saving interventions has been interrupted by the COVID-19 pandemic.[2]

large-scale nutrition and social protection programmes, including ascertaining what does not work, is needed to catalyse progress. This call for implementation research for nutrition is not new,[5,6] but has not been prioritised by donors, researchers, national governments, and high-impact journals.

For nutrition interventions delivered through the health sector, an important question is how to maximise coverage and minimise delivery costs by using existing

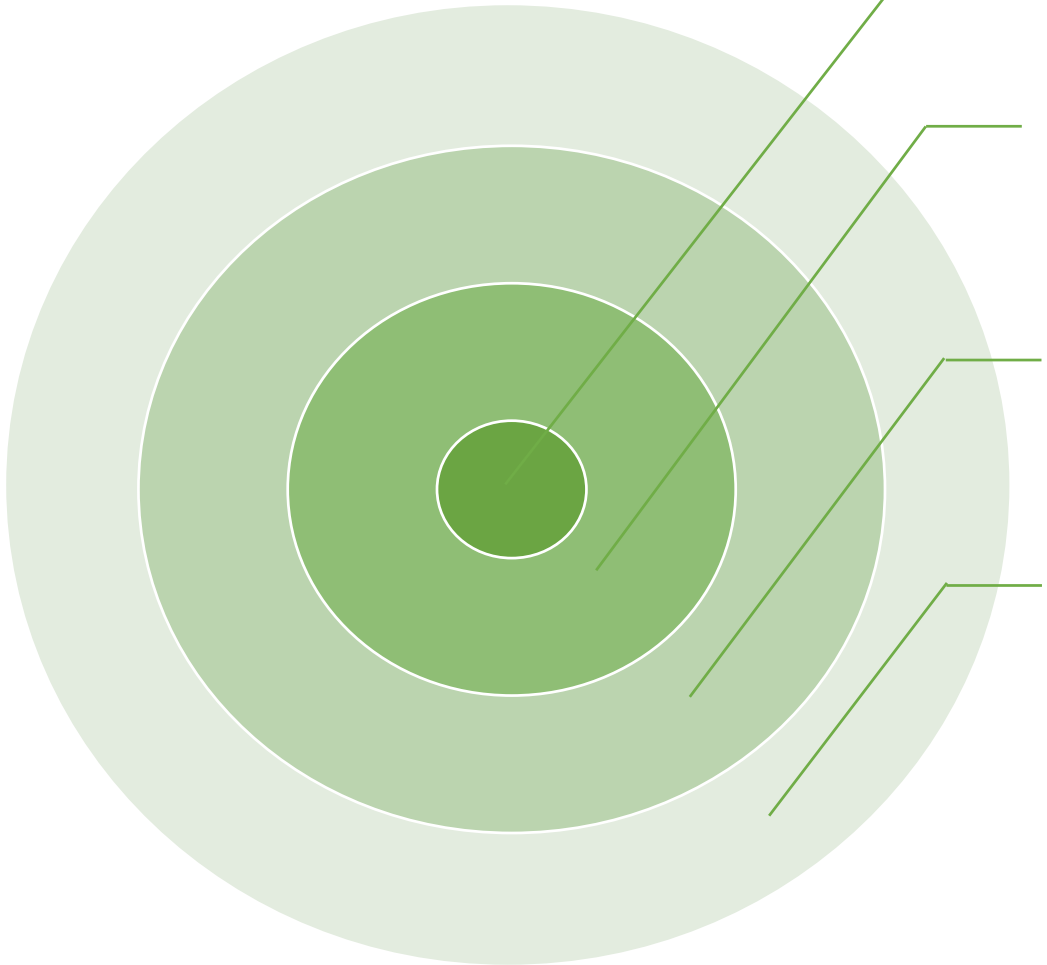
Published Online March 7, 2021 https://doi.org/10.1016/S0140-6736(21)00577-8

See Online/Series https://doi.org/10.1016/S0140-6736(21)00394-9 and https://doi.org/10.1016/S0140-6736(21)00568-7

Shekar M, Condo J, Pate MA, Nishtar S. Maternal and child undernutrition: progress hinges on supporting women and more implementation research. Lancet. 2021 Apr 10;397(10282):1329-1331. doi: 10.1016/S0140-6736(21)00577-8. Epub 2021 Mar 7. PMID: 33691093.; Keats EC, Das JK, Salam RA, Lassi ZS, Imdad A, Black RE, Bhutta ZA. Effective interventions to address maternal and child malnutrition: an update of the evidence. Lancet Child Adolesc Health. 2021 May;5(5):367-384. doi: 10.1016/S2352-4642(20)30274-1. Epub 2021 Mar 7. PMID: 33691083.

Micronutrient FORUM

Integrating micronutrient interventions across systems



Access to **micronutrient-rich foods**

Health systems deliver messages on dietary diversity and supplements to those in high needs

Food systems need to deliver LSFF and invest in micronutrient rich climate-resilient food crops (biofortification) agricultural interventions

Social protection programs need to ensure equal access to nutritious foods

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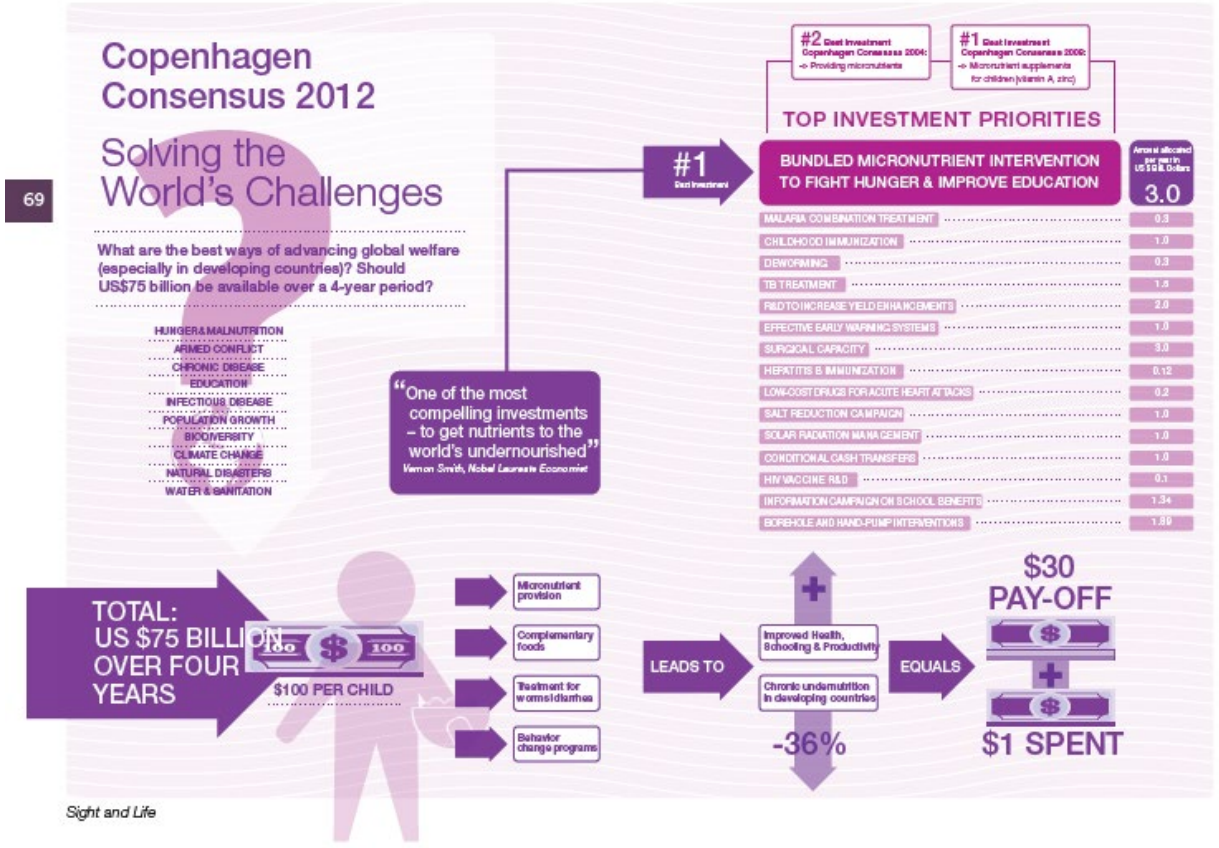
Return on Investments of nutrition interventions….



16x return on investment

for scaling nutrition interventions in target geographies.

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Nutrition and Resilience

Resilience

Micronutrient FORUM

Framing resilience

- **Absorptive** — Prepare, prevent and protect
- **Adaptive** — Mitigate, absorb and adapt during crisis
- **Transformative** — Restore, recover and transform after disruption

Individual **Family** **Community** **Institution** **Policy**

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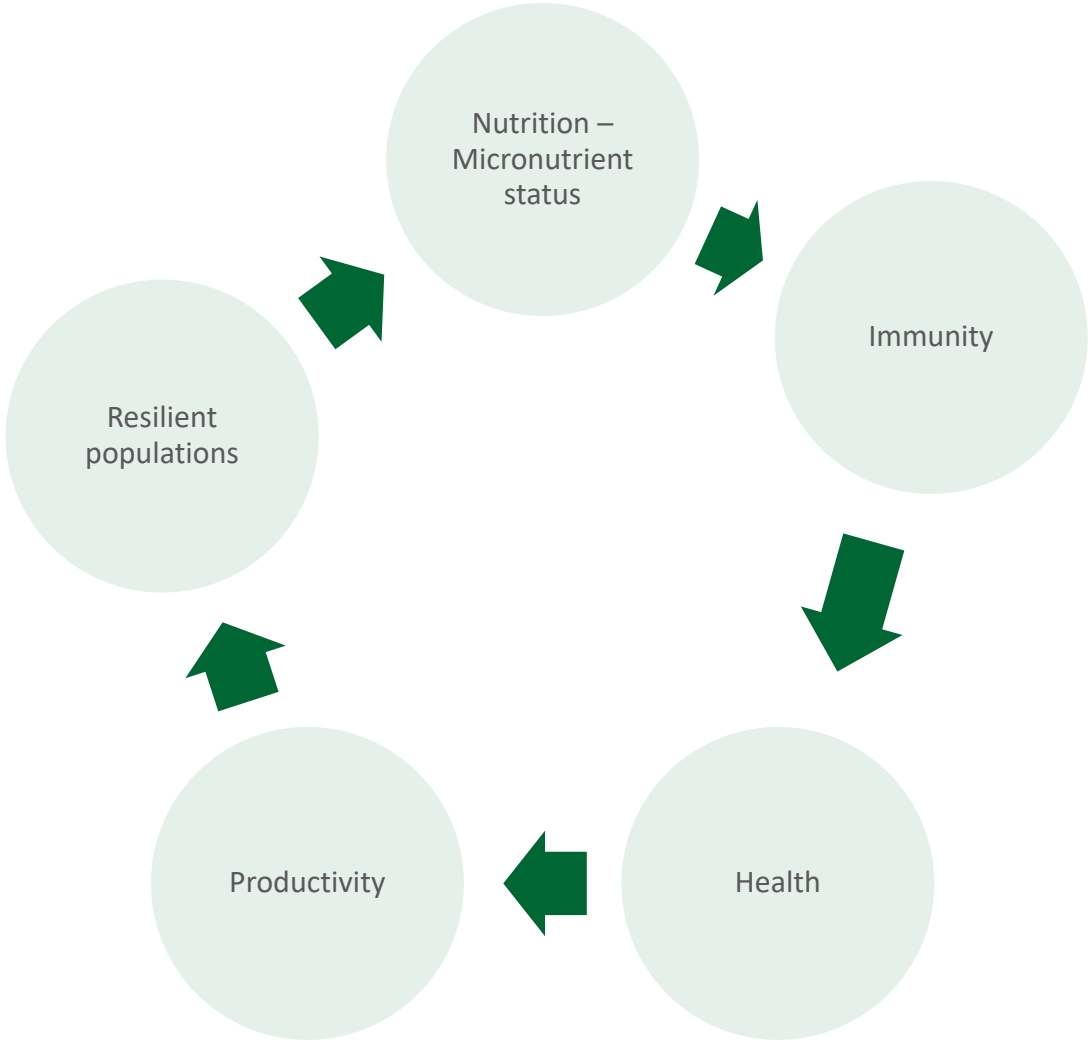
Nutrition and Resilience



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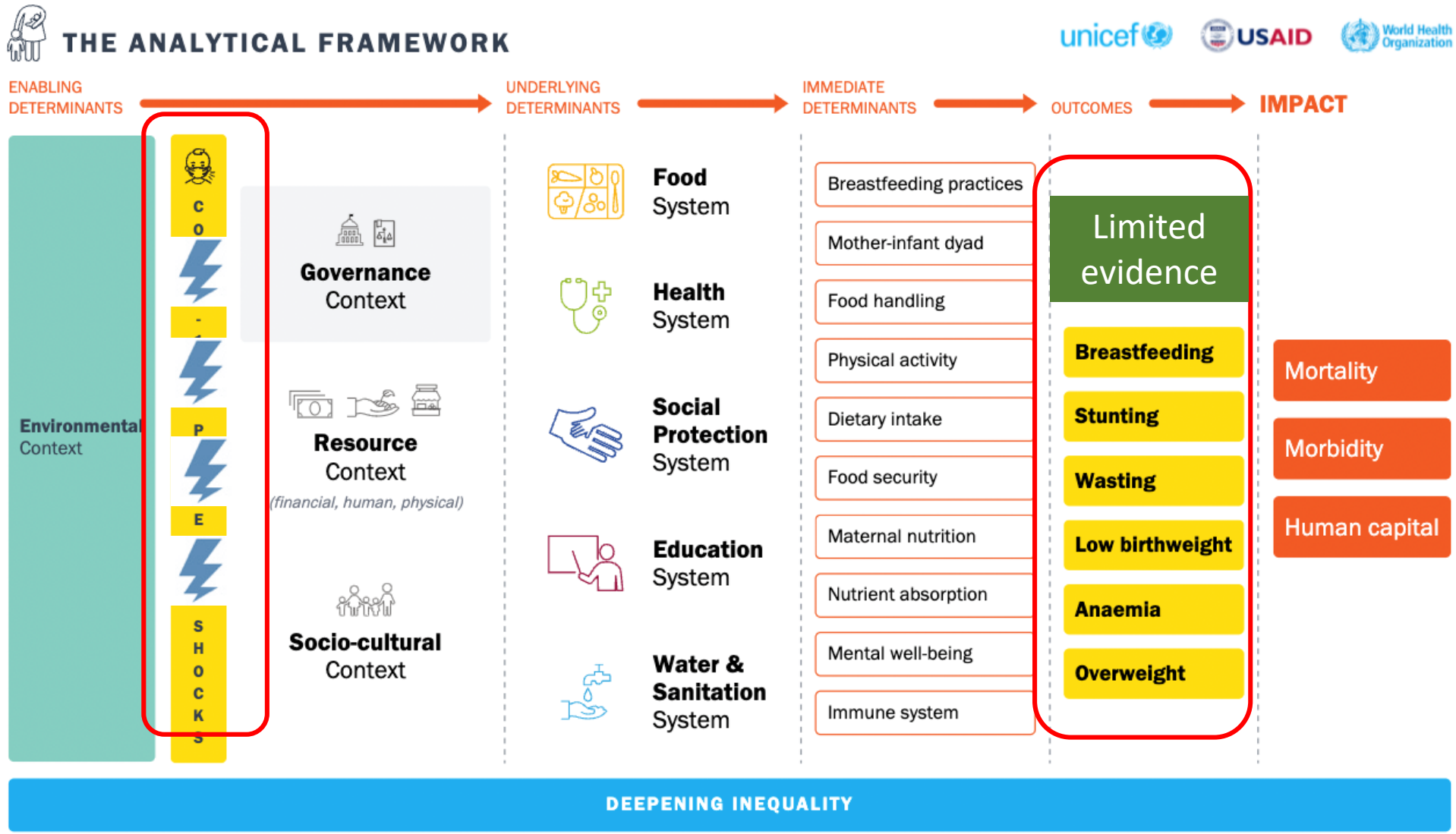
A Story of Resilience



https://www.advancingnutrition.org/resources/covid-19-and-nutrition-analytical-framework

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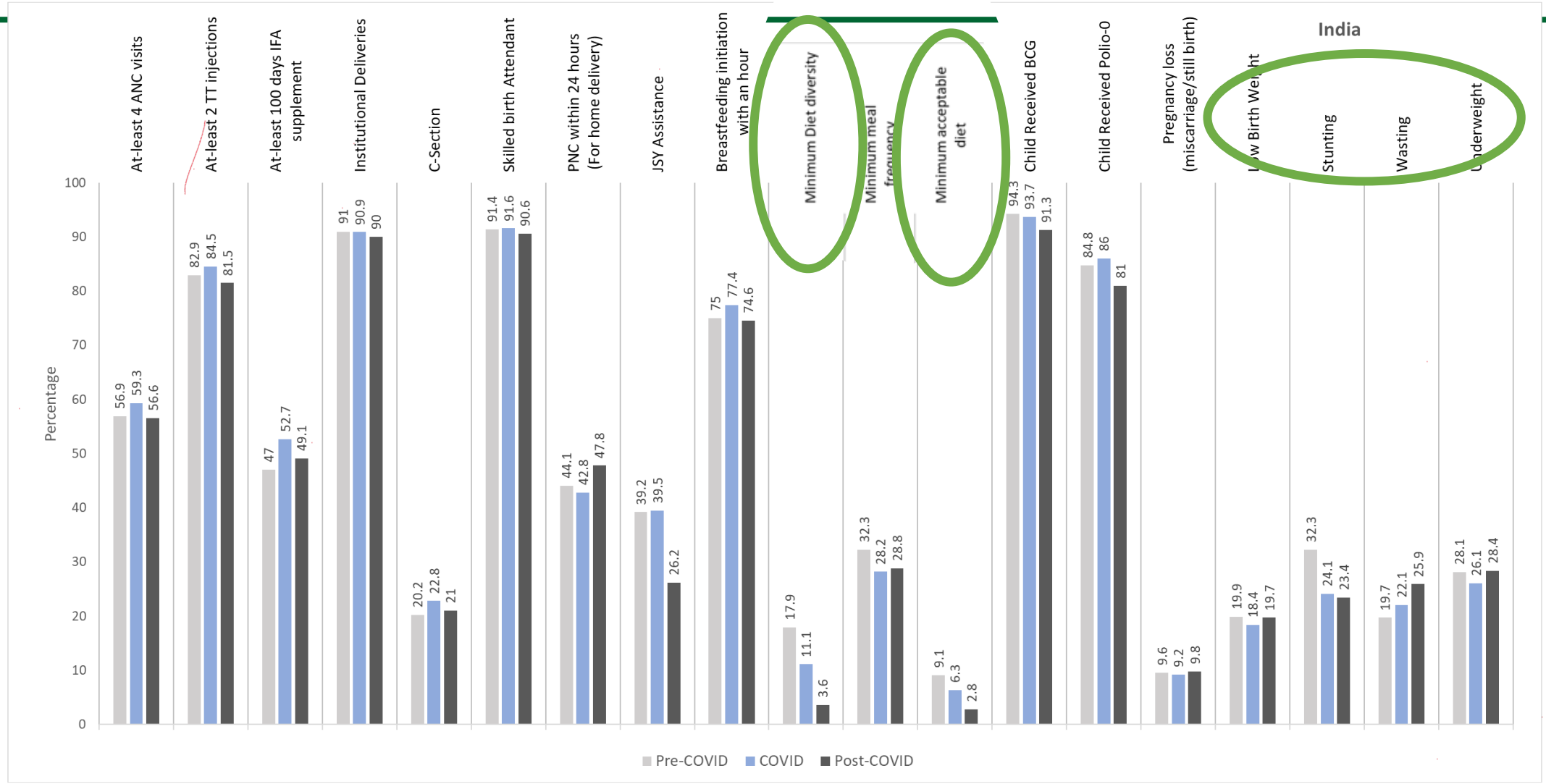
India NDHS survey included pre & post COVID-19



MDD-minimum diet diversity, MMF-minimum meal frequency and MAD-minimum acceptable diet

Micronutrient FORUM

Deep dives: multisector

Food System

Health System

Social Protection System

Education System

Water & Sanitation System

- Ethiopia, Kenya, Mozambique, Nigeria, Tanzania, Peru: GAIN SME
- Peru: Food fortification

- UNICEF countries: Vitamin A
- Indonesia: Family MUAC screening

- Somalia expanded mobile money cash program
- Colombia extended program for Venezuelans & and poorest HH

Gender

Slide courtesy: Rebecca Heidkamp

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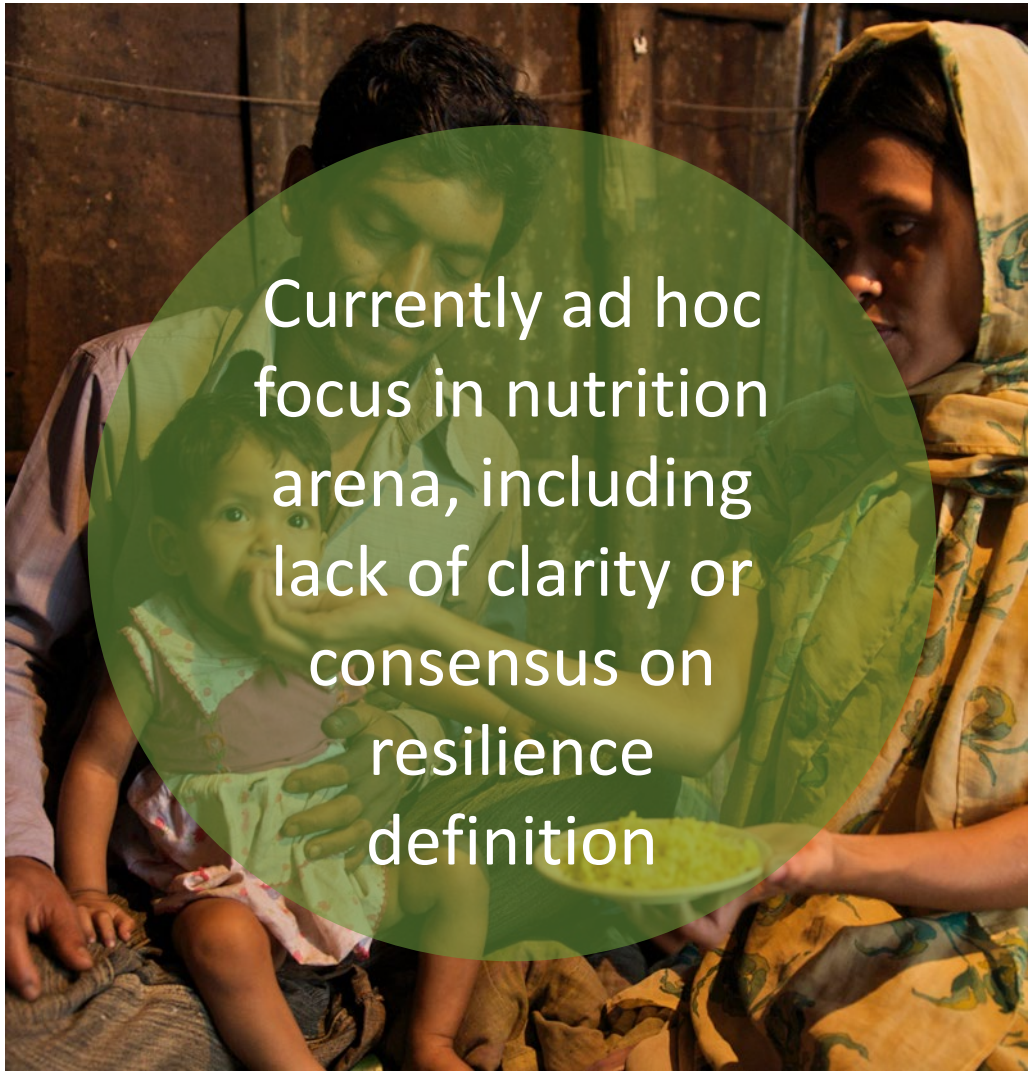
Understanding nutritional drivers of resilience

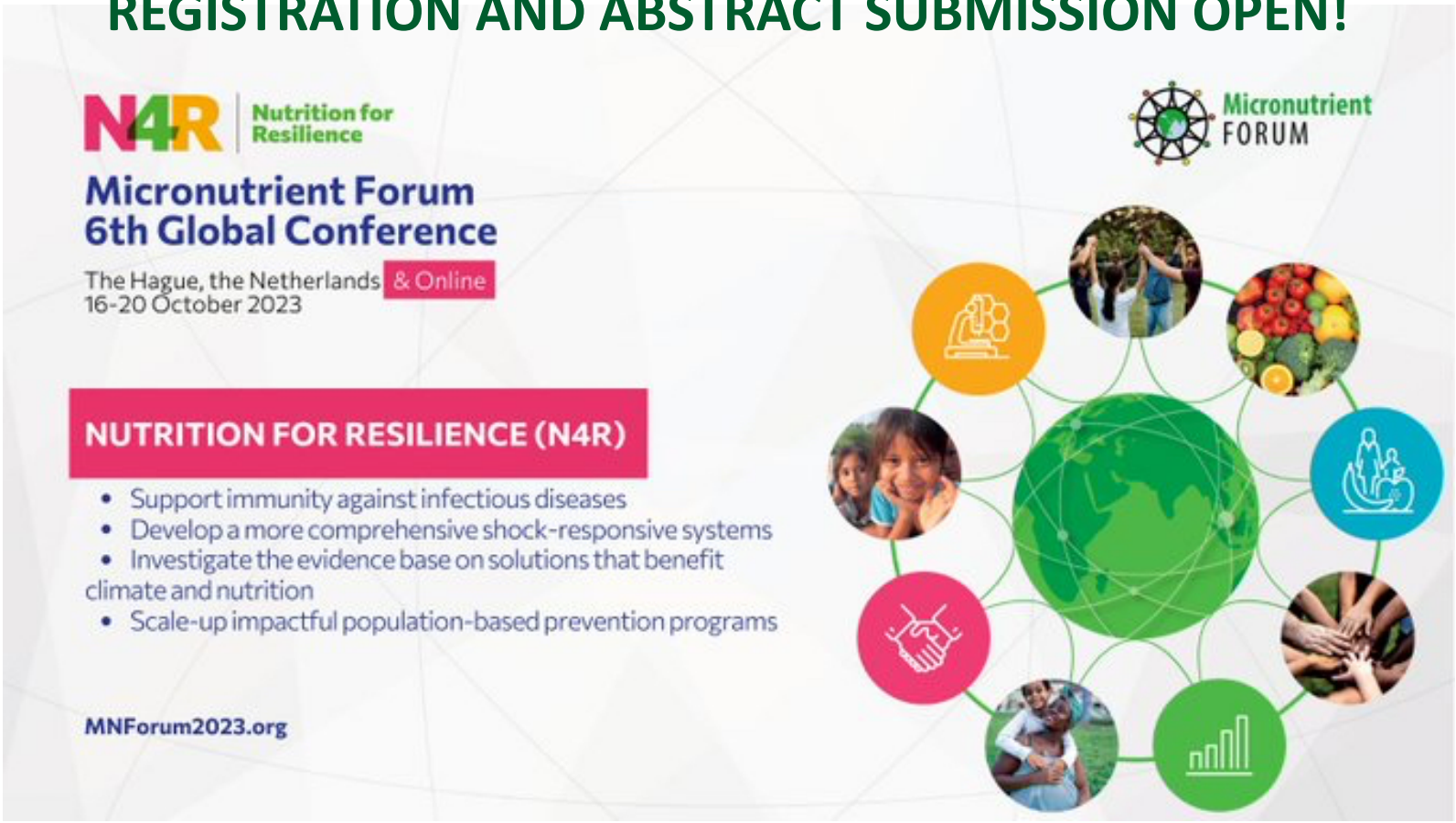


- **SUPPORT** immunity against emerging waves of infectious diseases
- **DEVELOP** more comprehensive shock-responsive systems in fragile settings
- **SCALE-UP** impactful population-based interventions
- **IMPLEMENT** prevention programs across both crisis and non-crisis contexts

Micronutrient FORUM

Micronutrient Forum 6th Global Conference 2023

REGISTRATION AND ABSTRACT SUBMISSION OPEN!



Continued strong scientific focus on MN with deeper dive on resilience across tracks - basic biology & immunology, programs, enabling policy environment

https://mnforum2023.org

Micronutrient FORUM

Key Messages

- Nutrition is in crisis in a world facing:
  - COVID-19
  - Conflicts
  - Food price Crises
  - Climate Change

- Science and speaking with a unified voice matters

- Evidence-based policy and investment recommendations are critical to drive impactful actions and programs

- Effective programs make communities and systems more resilient to future crises

“We cannot afford to lose an entire generation of children due to the consequences of malnutrition.”

Micronutrient FORUM

Thank you.

Connect with us!

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info@micronutrientforum.org

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