



How nutritionally valuable are animal-source foods?

Flaminia Ortenzi

Senior Research Associate, Global Alliance for Improved Nutrition (GAIN)

PhD candidate, Vrije Universiteit (VU) Amsterdam

Email: fortenzi@gainhealth.org

September 11, 2025



OUTLINE

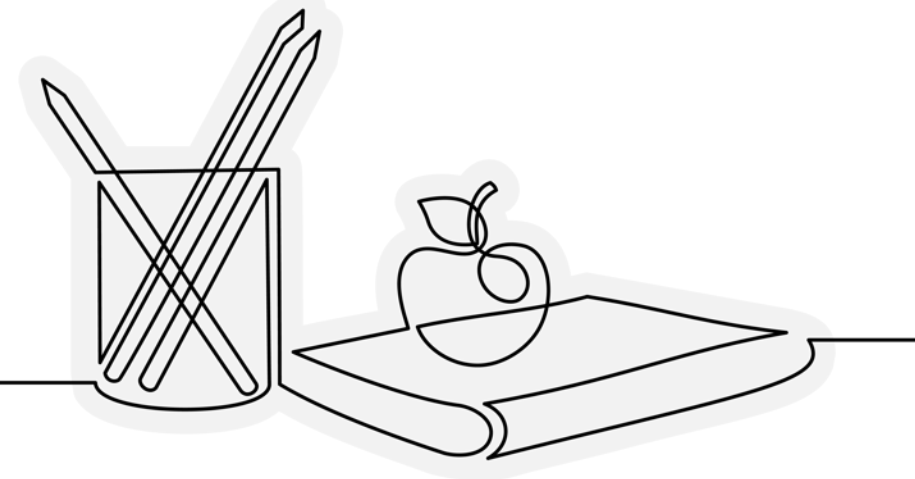
➤ **Are deficiencies / inadequacies in essential nutrients an LMIC problem?**

- Global burden of hidden hunger
- Global prevalence of inadequacies in seafood omega-3s
- Global burden of protein malnutrition

➤ **How valuable are animal-source foods for global nutrition?**

- Multi-dimensional value of animal-source foods
- Nutritional Value Scores (NVSs)
- Priority Micronutrient Density Scores
- The role of animal-source foods in global nutrition

➤ **What does this mean for policy, programmes, and investments?**



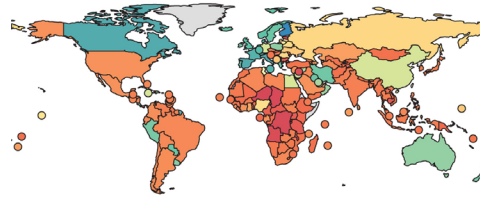
A decorative background featuring a repeating pattern of stylized, teardrop-shaped leaves in a lighter shade of red, arranged in a circular, sunburst-like pattern.

**Are deficiencies / inadequacies
in essential nutrients an LMIC
problem?**

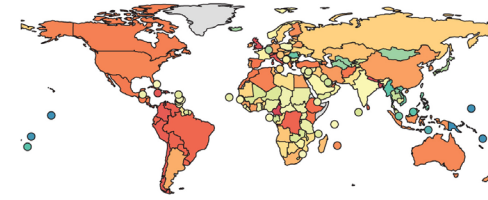
GLOBAL BURDEN OF HIDDEN HUNGER

- **More than half** of the global population have **inadequate intakes** of several essential micronutrients
- **>5 billion people** do not consume enough **iodine (68%)**, **vitamin E (67%)**, and **calcium (66%)**
- **>4 billion people** do not consume enough **iron (65%)**, **riboflavin (55%)**, **folate (54%)**, and **vitamin C (53%)**

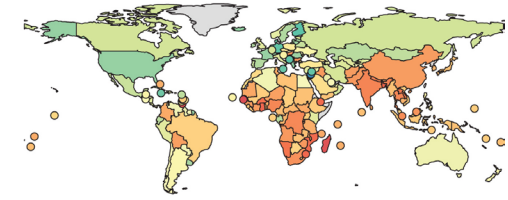
Iodine, 5.1 billion (68%)



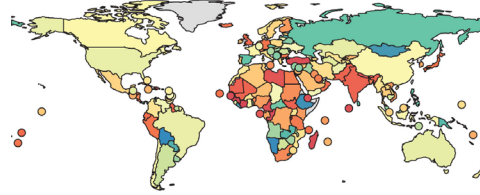
Vitamin E, 5.0 billion (67%)



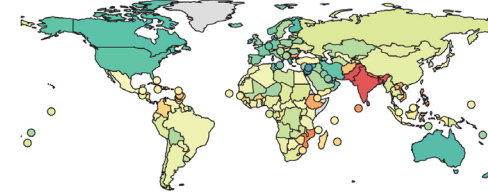
Calcium, 5.0 billion (66%)



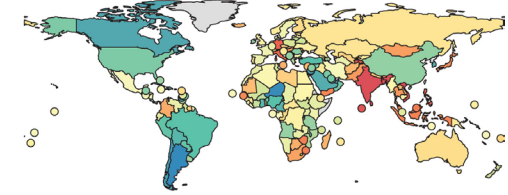
Iron, 4.9 billion (65%)



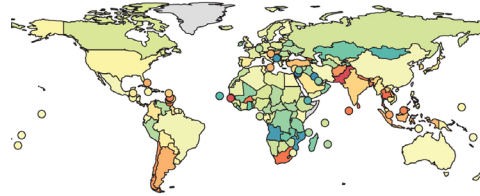
Riboflavin, 4.1 billion (55%)



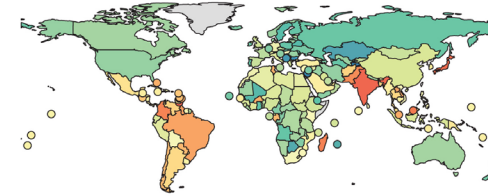
Folate (DFE), 4.0 billion (54%)



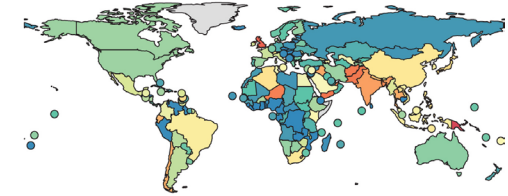
Vitamin C, 4.0 billion (53%)



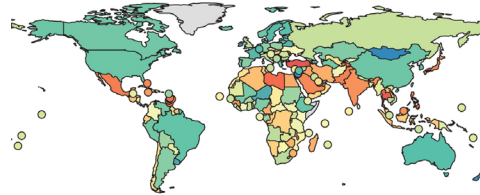
Vitamin B6, 3.9 billion (51%)



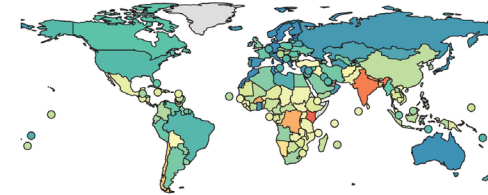
Vitamin A (RAE), 3.6 billion (48%)



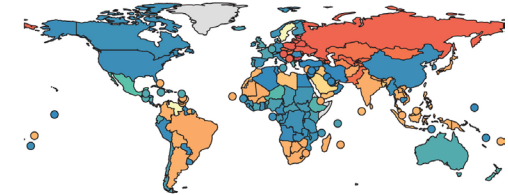
Zinc, 3.5 billion (46%)



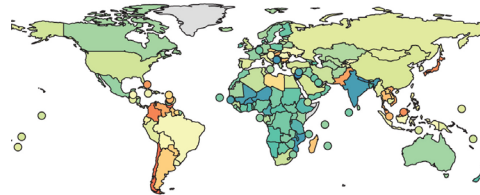
Vitamin B12, 3.0 billion (39%)



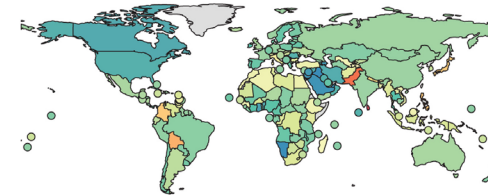
Selenium, 2.8 billion (38%)



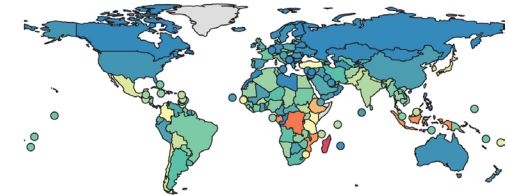
Magnesium, 2.4 billion (31%)



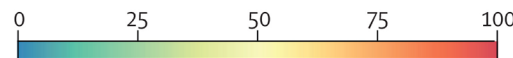
Thiamin, 2.2 billion (30%)



Niacin, 1.7 billion (22%)

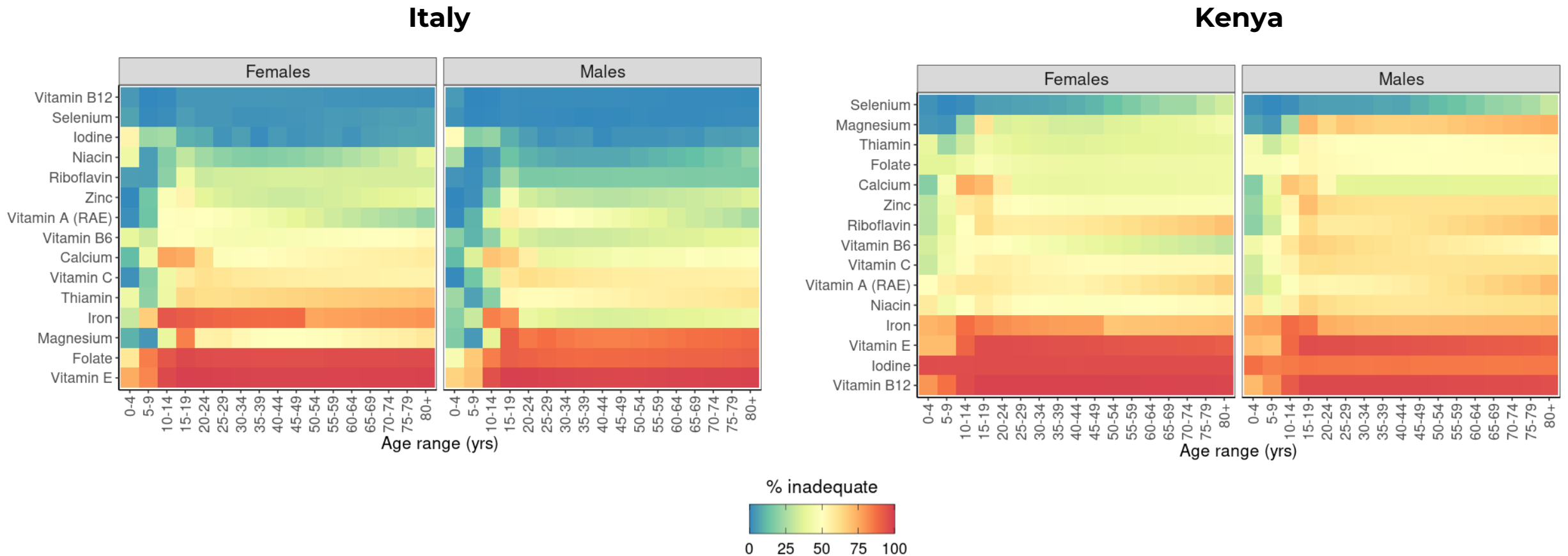


Proportion of population with inadequate intake (%)

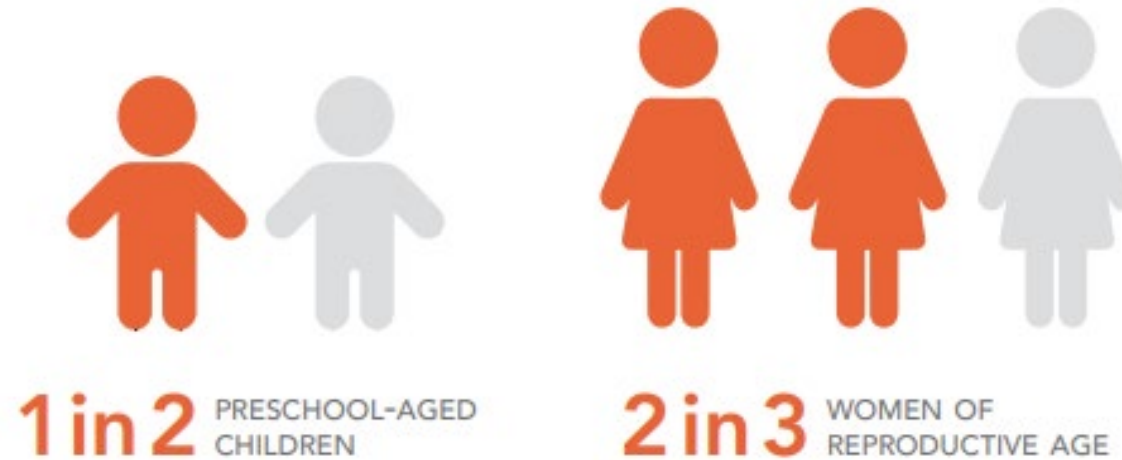


BURDEN DISTRIBUTION ACROSS GEOGRAPHIES & DEMOGRAPHIC GROUPS

Visualizations of national and subnational micronutrient intake distributions and inadequacies for cross- and within-country comparisons: https://emlab-ucsb.shinyapps.io/global_intake_inadequacies/



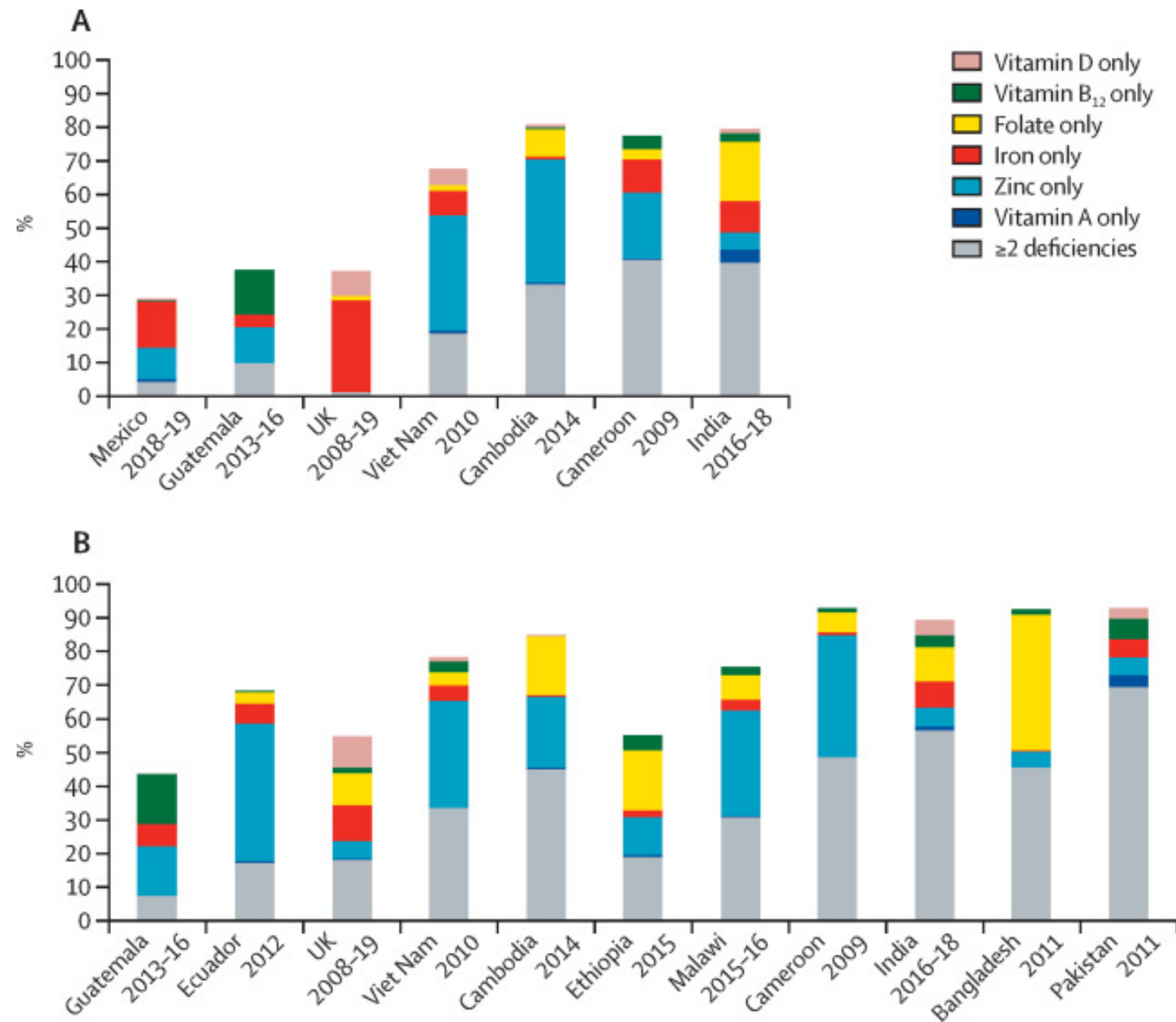
MICRONUTRIENT MALNUTRITION AMONG VULNERABLE GROUPS



Over **half of children under-5** (372 million) and **two-thirds of women** of reproductive age (1.2 billion) globally are **deficient in at least one essential micronutrient**

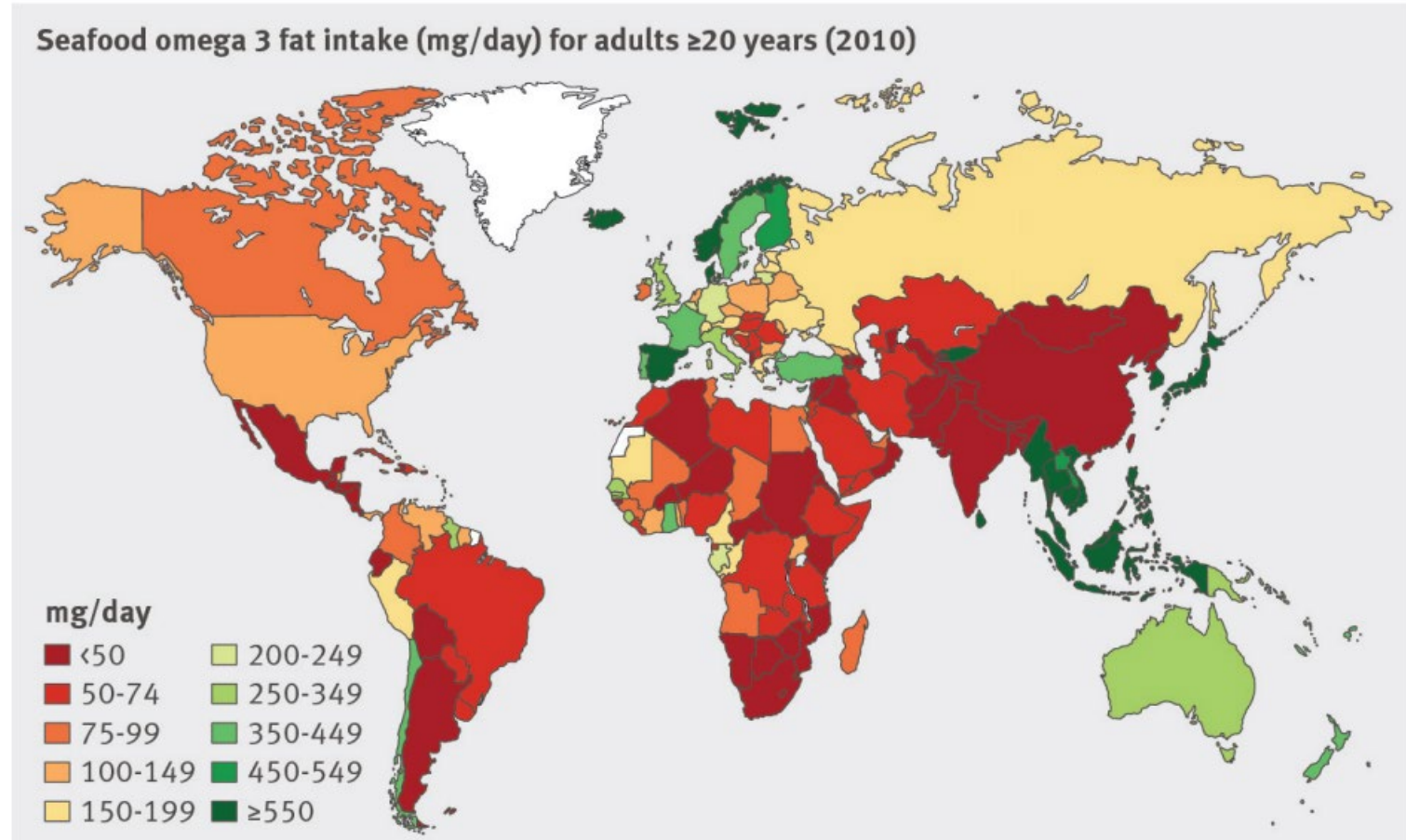
MICRONUTRIENT MALNUTRITION AMONG VULNERABLE GROUPS

- About **three-quarters (70%)** of children under-5 and women of reproductive age with micronutrient deficiencies live in **Sub-Saharan Africa, South Asia, and East Asia & the Pacific**
- However, micronutrient deficiencies are **not only an LMIC problem**
- For example, in the **UK, 37% of children under-5** and **55% of women of reproductive age** are deficient in one or more essential micronutrients



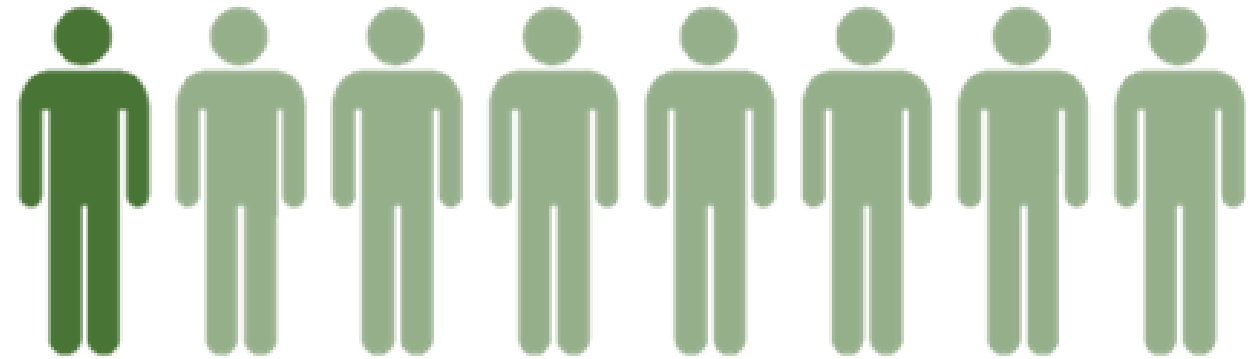
GLOBAL PREVALENCE OF INADEQUACIES IN SEAFOOD OMEGA-3s

- Large regional and national **variations in mean intakes**
- Only 45 out of 187 countries achieved adequacy (≥ 250 mg/day)
- Consumption was far below optimal in many regions, with **142 countries** having mean intakes **lower than recommended levels**
- **100 countries**, mostly in Sub-Saharan Africa, mainland Asia, North Africa, and the Middle East, had **extremely low intakes (<100 mg/day)**



GLOBAL BURDEN OF PROTEIN MALNUTRITION

- ~1 billion people have **chronically inadequate protein intake** or **protein-energy malnutrition**
- The burden is **highest in LMICs**, but deficiencies / inadequacies are also common among **vulnerable populations in HICs**
- For example, a **US** study found that:
 - **Over half** of home-bound elderly adults have protein intakes below the RDA
 - ~**20%** do not meet the RDA for **at least one** indispensable amino acid
 - ~**11%** do not meet the RDA for **at least five** indispensable amino acids

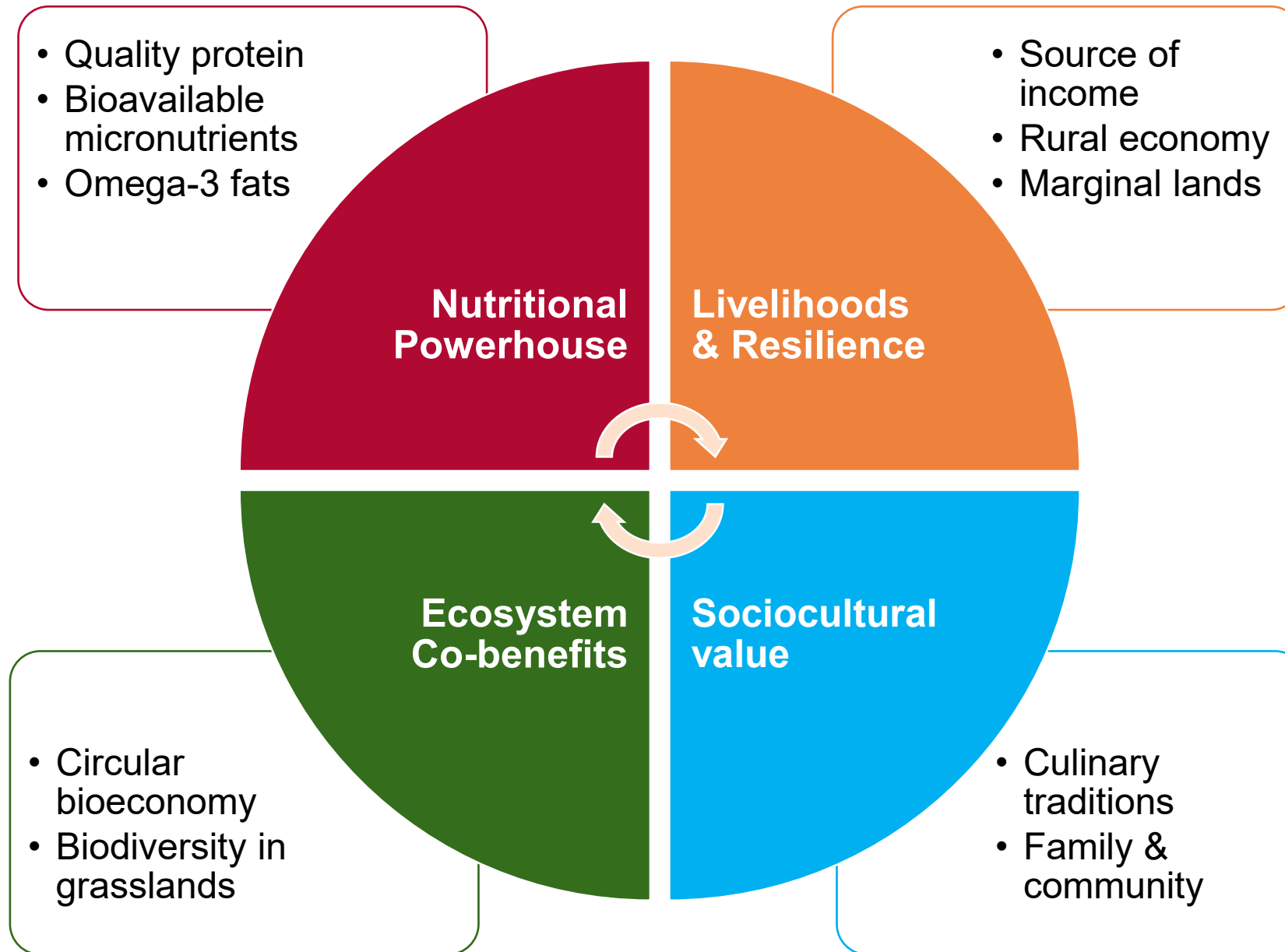


1 in 8 people

A large, stylized graphic of a plant with several leaves, rendered in a lighter shade of red than the background, framing the central text.

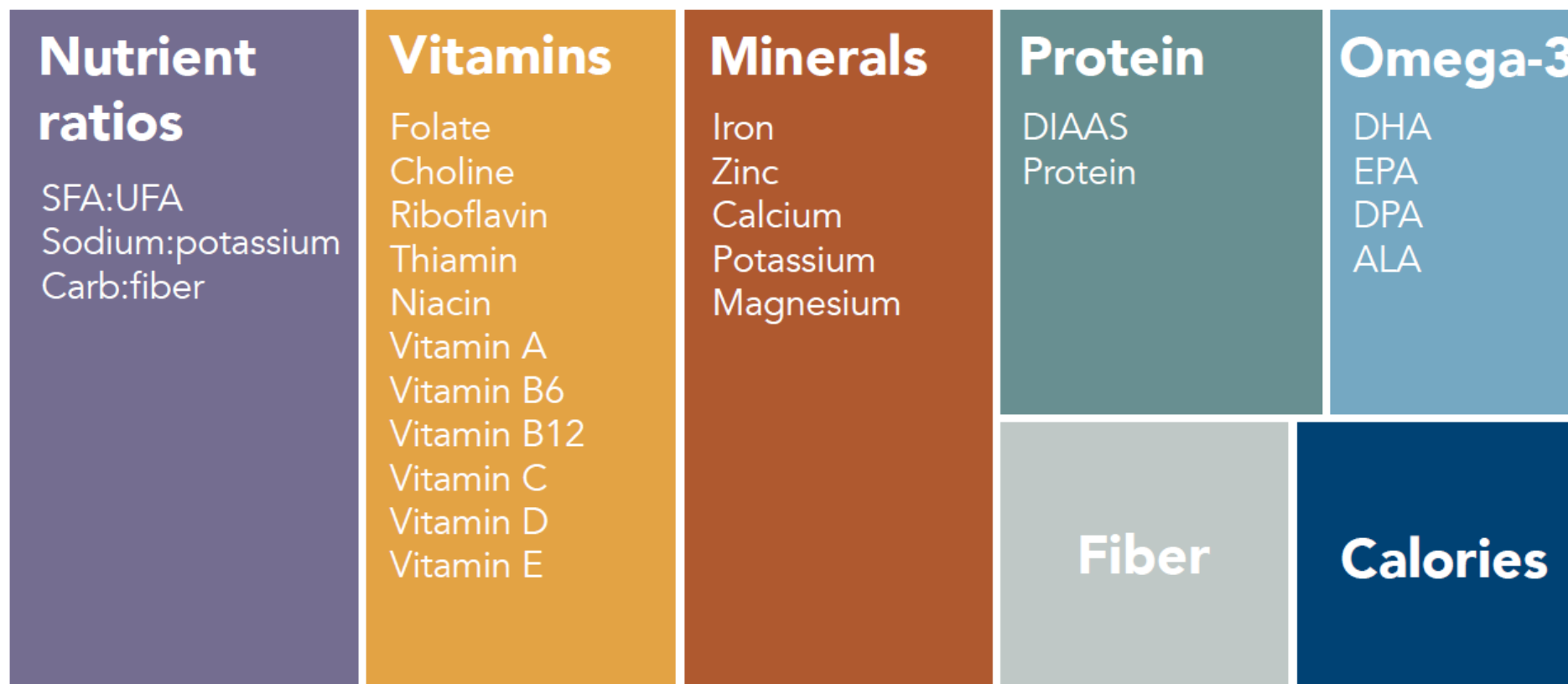
**How valuable are animal-
source foods for global
nutrition?**

MULTI-DIMENSIONAL VALUE OF ANIMAL-SOURCE FOODS



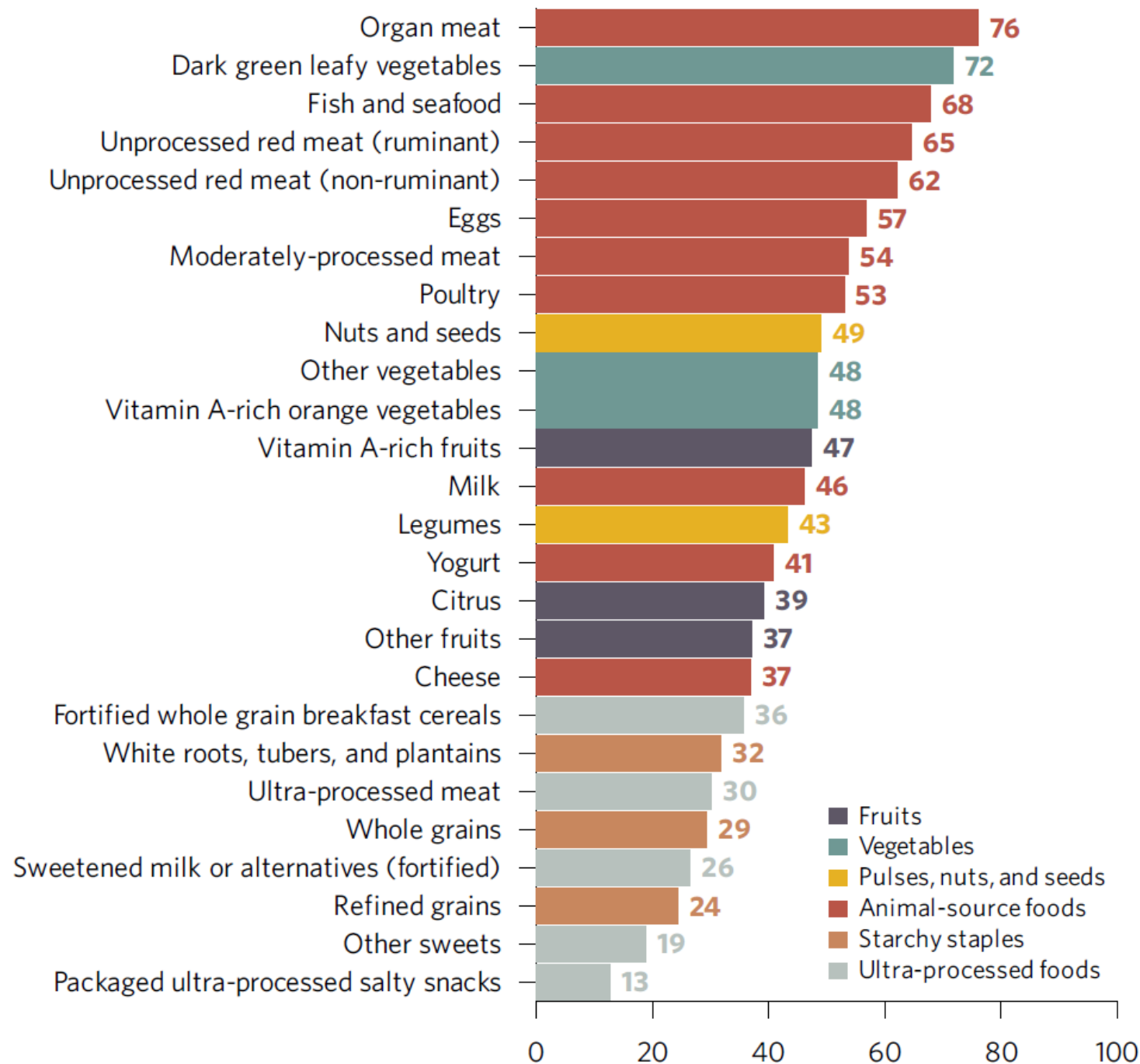
THE NUTRITIONAL VALUE SCORE (NVS)

- **What is it?** An innovative **Nutrient Profiling System (NPS)** to holistically assess the relative nutritional value of individual foods, food groups, meals, and whole diets
- **What can it be used for?** To inform **policy, programmatic, industry, and investment decisions** on which foods to prioritize for the greatest nutritional and health impacts



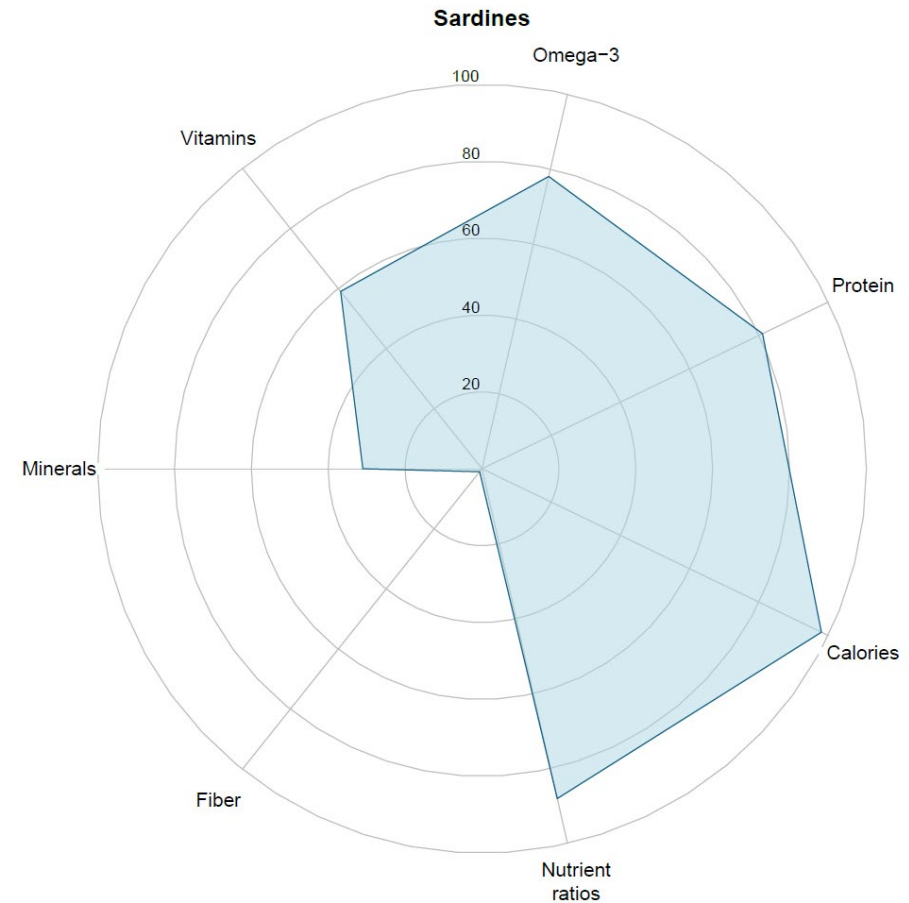
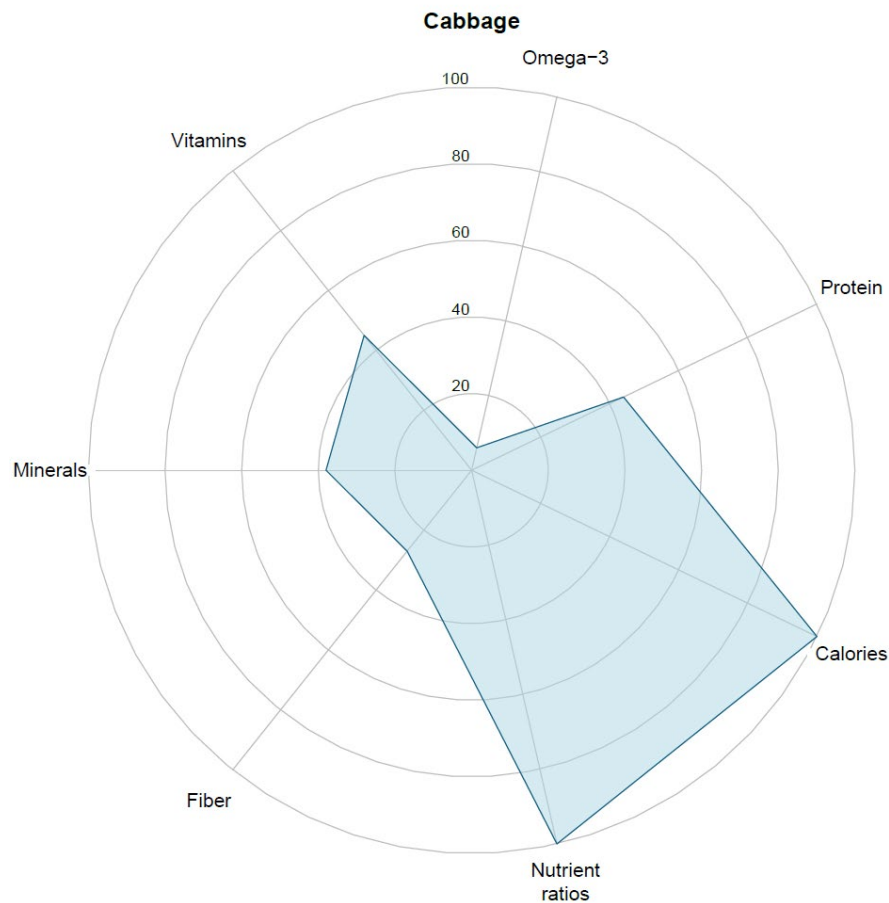
Nutritional Value Scores for 425 unique foods commonly consumed in Sub-Saharan Africa, categorized into 27 food groups

Scaled from 1 (lowest) to 100 (highest)



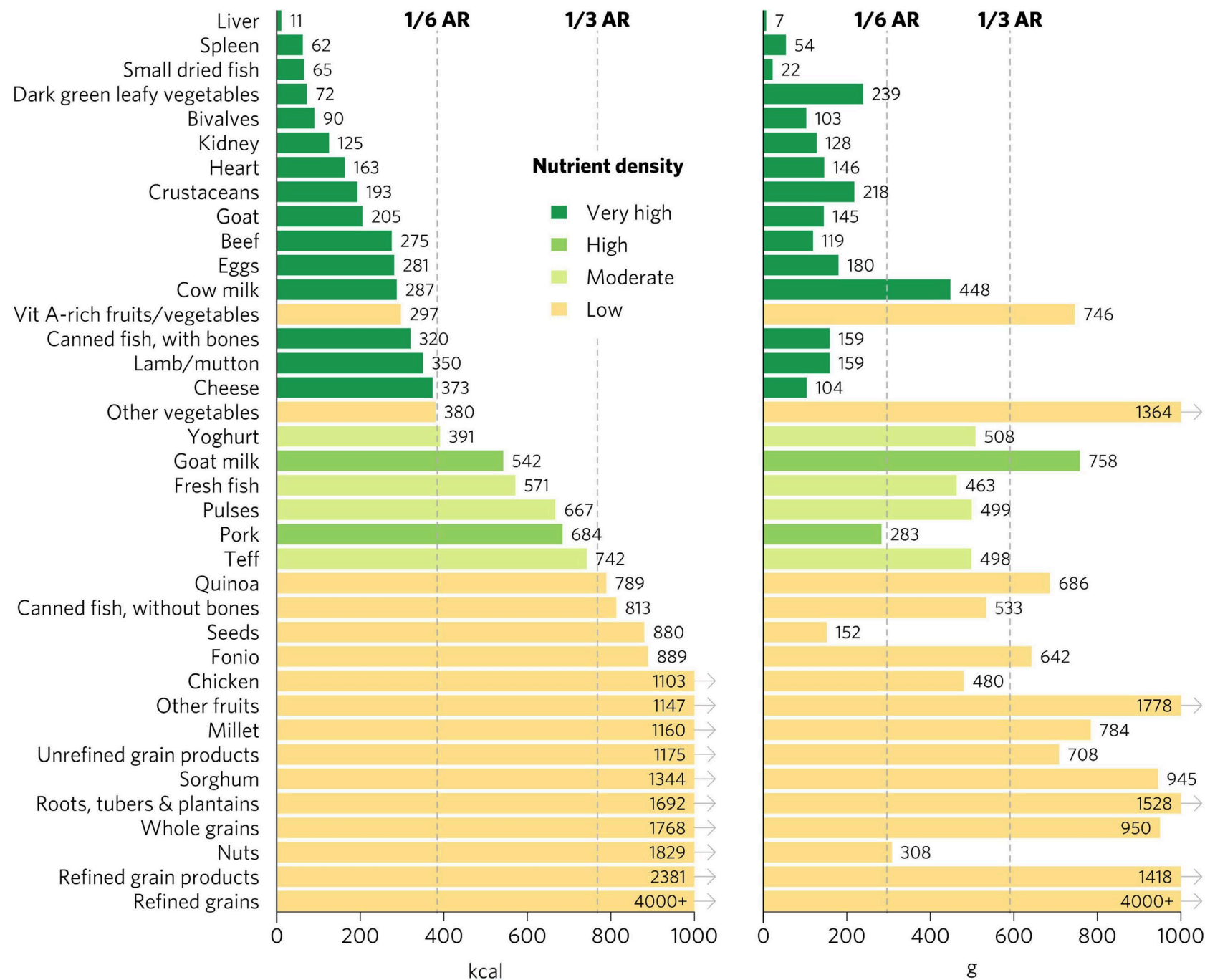
MULTI-COMPONENT NUTRITIONAL PROFILES OF SINGLE FOODS

- Nutritional value varies greatly **across and within food groups**
- No foods perform well against **all dietary components** analysed
- Plant- and animal-source foods have **complementary nutritional profiles**



Priority Micronutrient Density Scores of 41 aggregate foods from multiple geographic regions

Quantity of calories and grams required to provide an average of one-third of recommended intakes of **vitamin A, folate, vitamin B12, calcium, iron, and zinc** for women of reproductive age



THE ROLE OF ANIMAL-SOURCE FOODS IN GLOBAL NUTRITION

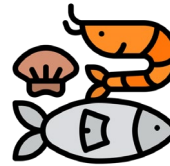
- Many essential nutrients commonly lacking in diets globally are found in **larger quantities** and **more bioavailable forms** in animal-source foods
- **Achieving adequacy** for some of these nutrients with primarily **plant-based diets** can be **challenging**



- Minimally processed, nutrient-dense animal-source foods **consistently score high** across geographic regions:



Rich in multiple micronutrients (e.g., **vitamins A & B12, iron, zinc**) and **high-quality protein**



Rich in several minerals (e.g., **iron, zinc, calcium, potassium, magnesium**), **high-quality protein**, and **long-chain omega-3s**



Rich in multiple micronutrients (e.g., **vitamins A, D & B12, iron, zinc, calcium**), and **high-quality protein**

THE ROLE OF ANIMAL-SOURCE FOODS IN GLOBAL NUTRITION

- Some essential nutrients and health-promoting compounds are **unique** to animal-source foods
- These can't be obtained from primarily **plant-based diets** without **fortification and/or supplementation**



- **Retinol, heme iron, vitamins B12 & D3**
- **DHA & EPA**
- **Complete** and balanced **amino acid profile**
- **Bioactive peptides and other beneficial compounds**, including creatine, anserine, taurine, cysteamine, 4-hydroxyproline, carnosine, & CLA

A large, stylized graphic of a plant with several leaves, rendered in a lighter shade of red than the background, framing the central text.

**What does this mean for
policy, programmes, and
investments?**

Thank you!

Rue Varem bé 7
1202 Geneva,
Switzerland
Mailing address:
PO box 55, 1211 Geneva 20

Website: www.gainhealth.org
Email: info@gainhealth.org

  @GAINAlliance

  Global Alliance for Improved Nutrition

