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Founder and CEO of Diet ID

Diet for the Health of People and Planet

Quantifying the Environmental
Impacts of Dietary Intake Patterns

April 27, 2022



The Planet Is Your Patient

David L. Katz

In 2021, as I write this, in any subsequent year that finds you reading it, and for that matter, for some number of years before this, too, one can no longer legitimately claim to be a “health” professional if not advocating frequently, and fiercely, for the health of the planet. Stated simply, there are no healthy people on a blighted planet no longer hospitable to the human animal. The planet is your patient; you should practice accordingly.

There is a specific motivation for this concluding exhortation beyond the obvious, the obvious being that our planet is desperately imperiled by our collective actions, our prevailing dietary patterns among them (1). That motivation is an amalgam of license, and relief.

On some number of occasions, before the COVID pandemic put actual podiums out of reach, I was privileged to address a sizable audience of fellow clinicians, and then meet many of them afterward, one on one, at a book signing or reception.

Those brief meetings routinely followed a talk in which I made the very assertion above, accompanied by some flourish of impassioned gesticulations: *“You cannot truly be a ‘health’ professional anymore if you do not promote and protect by every means at your disposal the health of the planet! Yes, you are indeed authorized to address it with your patients; we are duty bound to do so.”* Or something along those lines.

That is the “license” piece of the amalgam. I took it upon myself, presumptuously perhaps, to authorize my fellow clinicians to consider planetary health a clinical obligation because I deemed, and deem, it so. I exhorted them to take on the great public health imperative of nutrition in clinical practice in that crucial context.

And they lined up to thank me; therein lies the “relief.” More times than I can recall, colleagues in that queue or gathering shook my hand (another bit of pre-pandemic nostalgia!) and thanked me for providing them the “license” to address what (1) mattered enormously to them and kept them up at night worrying and (2) always felt to them like something outside their professional purview. By contending otherwise, I inadvertently took down a wall between personal exasperation and professional expression, and the relief rendered was something like the release of a pressure valve. Clinicians—educated, informed, aware, and alarmed—could, at last, do something other than stew in anxious insomnia over the fate of our shared home. They could raise the same awareness among their patients and offer guidance in the one area where we individuals might make a meaningful difference independent of government and industry: our daily food choices.

And so can you, and so you should. In this brief culmination, I presume to offer you what I offered those prior audiences: the opportunity, and the obligation, to advise your patients to eat as if the world depends on it. Quite simply, it does (2)—and that is the signature health issue of our time.

For the most part, this is a relatively easy task for readers of this text. You are presumably, by self-selection, in a group more inclined than your recent predecessors to acknowledge and address the salience of nutrition in human health. The exhortation to factor the planet into those exchanges would complicate matters were the exigencies of human and planetary health discordant. Fortunately, as detailed by the seminal EAT-Lancet Commission on Food, Planet, Health (2)—among others—the needs of

people and planet for
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avoiding enorm
from eating mor
from eating food
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even when exa
of dietary inta
notably longe
planet in ter
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Agenda

- **Dietary priorities for the health of people & planet**
Dean Ornish
- **Sustainable agriculture in the service of planetary and public health**
Dani Nierenberg
- **People, Planet, and Protein - a reality check**
Christopher Gardner
- **Dietary Impacts on Environmental Measures: It's time to quantify**
David Katz
- **Q&A**

People, Planet, Protein

Reality Check

Christopher Gardner, PhD
Rehnborg Farquhar Professor of Medicine
Nutrition Scientist
Stanford University

 @GardnerPhD

Are you getting enough protein?

Requirement



Intake



THE PROTEIN FLIP

A DELICIOUS STRATEGY FOR CHANGE

TRANSFORMING PROTEIN MENU CONCEPTS
FOR THE HEALTH OF OUR CUSTOMERS AND OUR PLANET

MENSOFCHANGE.ORG

THE PROTEIN FLIP



HOW CAN CHEFS INSPIRE STRATEGIES
TO FEED A WORLD OF 9-10 BILLION?



CHEFS CAN MAKE A TREMENDOUS IMPACT THROUGH THE PROTEIN FLIP.



Instead of feeding plants and grains to animals, feed them directly to diners...with much smaller amounts of accompanying animal protein.



Ask: "What level of global animal agricultural production in 2050 supports optimal public health and is environmentally sustainable?"



And: "How do we enlist chefs, behavioral specialists, and visionaries in design thinking and marketing to create patterns of food choices, dishes, and menus that flip the role of protein and fully meet consumer acceptance?"



It's also time for chefs to leave behind the habit of using "protein" as a synonym for "meat." Cultural shifts like these in the chef community can help broaden the general mindset about protein in the U.S.

PRINCIPLES OF HEALTHY, SUSTAINABLE MENUS

MENUS@CHANGE
The Business of Healthy, Sustainable, Delicious Food Choices



This strategy document highlights why it is essential to re-imagine the role of protein in foodservice, and how to do so in inventive ways that appeal to diners. This resource is part of a broader educational effort to help chefs and the foodservice industry stay ahead of health and environmental issues and trends that are reshaping our future. Read the [Menus of Change Principles of Healthy, Sustainable Menus](#) here.

THE PROTEIN FLIP



WHEN IT COMES TO PLANT AND ANIMAL PROTEINS, IT'S NOT EITHER/OR

Address the health and environmental impacts of red meat consumption with the Protein Flip: rebalance the foods on our plates, re-imagine the value proposition of what we menu, and draw inspiration from global cuisines.



...TO A FARRO BOWL WITH CORN, SUMMER SQUASH, TOMATOES, AND A TWO-OUNCE STEAK...



FROM A T-BONE...



...OR A WHOLE-WHEAT PENNE BOLOGNESE WITH 2 OZ. OF GROUND BEEF, TOPPED WITH SMOKED CHERRY TOMATOES AND GRILLED ZUCCHINI...



...OR SHREDDED CHICKEN-BEEF BLEND TACOS WITH AVOCADO, CREMA, AND PURPLE CABBAGE...



...OR A BROCCOLI STIR-FRY WITH A FEW SMALL PIECES OF BEEF...



...OR A VEGETABLE-FORWARD BEEF SALAD...

This PDF is available from The National Academies Press at http://www.nap.edu/catalog.php?record_id=10490



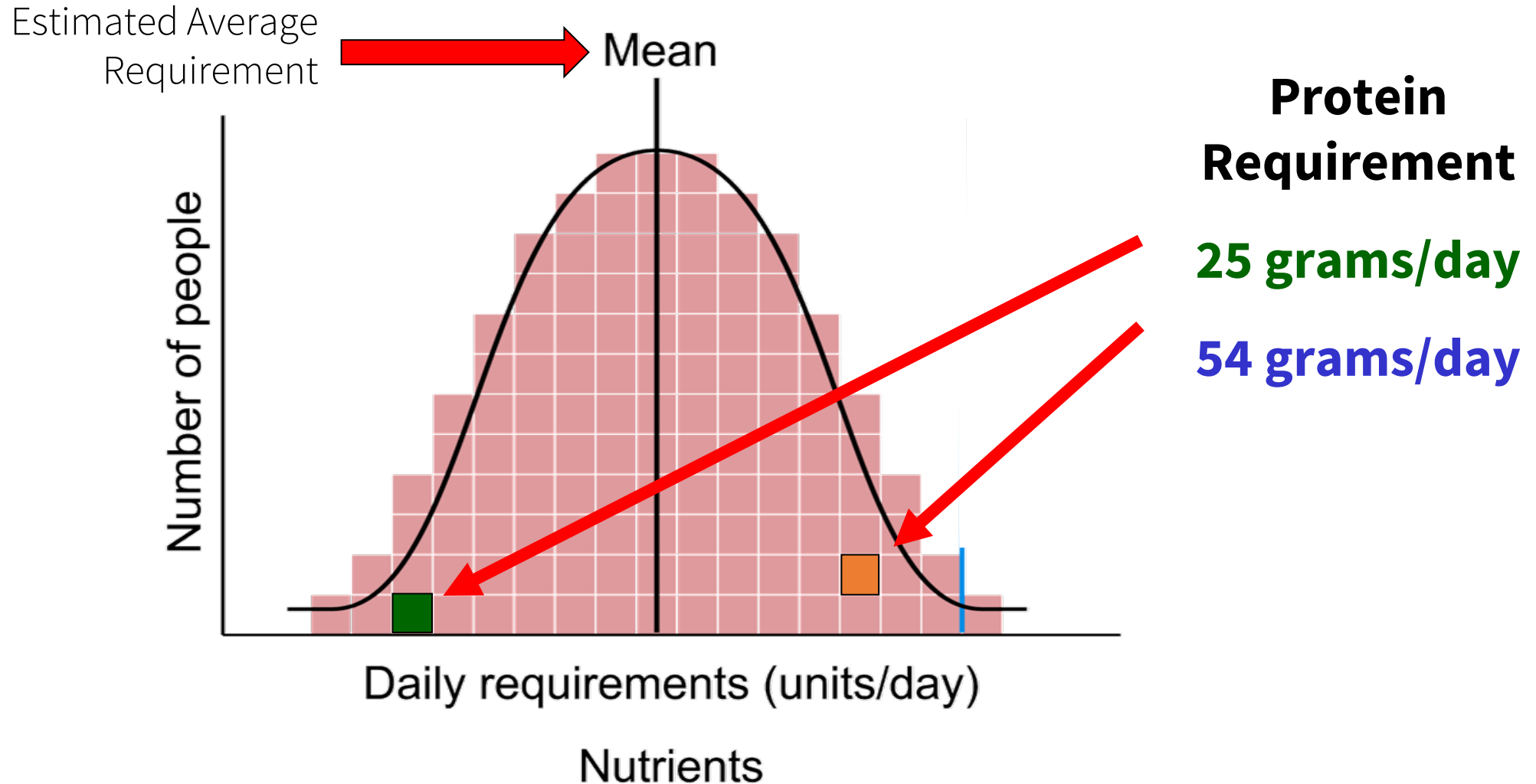
Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (Macronutrients)

ISBN
978-0-309-08525-0

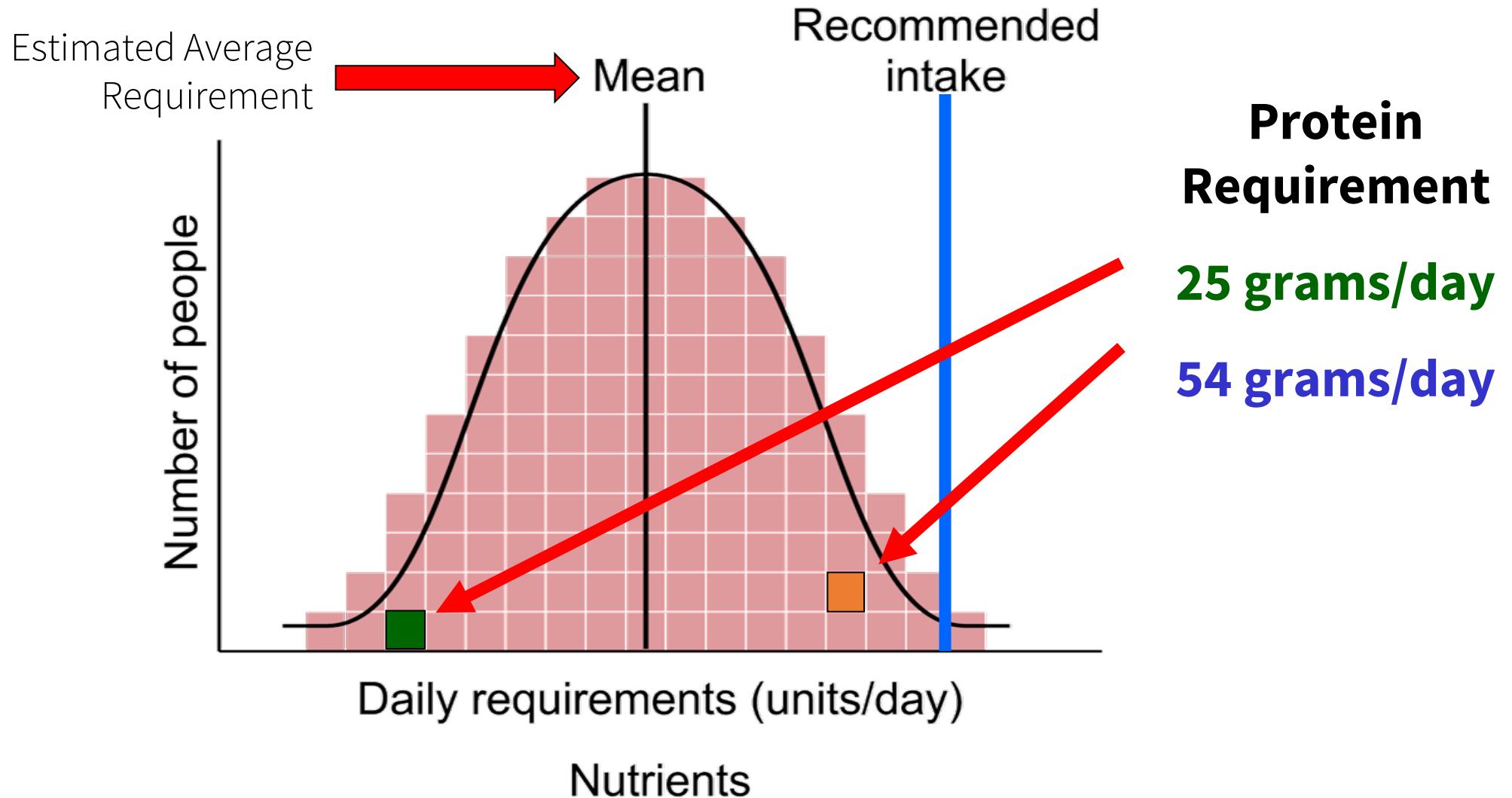
1357 pages
6x9
PAPERBACK (2005)

A Report of the Panel on Macronutrients, Subcommittees on Upper Reference Levels of Nutrients and Interpretation and Uses of Dietary Reference Intakes, and the Standing Committee on the Scientific Evaluation of Dietary Reference Intakes

Estimated Average Requirement (EAR)



Recommended Daily Allowance (RDA)



Req't / Rec / Intake

		125 lbs (57 kg)	175 lbs (80 kg)	225 lbs (102 kg)	275 lbs (125 kg)
Estimated Average Requirement	0.66 g/kg	38 g	52 g	67 g	82 g

Req't / Rec / Intake

		125 lbs (57 kg)	175 lbs (80 kg)	225 lbs (102 kg)	275 lbs (125 kg)
Estimated Average Requirement	0.66 g/kg	38 g	52 g	67 g	82 g
Recommended Daily Allowance	0.8 g/kg	46 g	64 g	82 g	100 g

Req't / Rec / Intake

**125 lbs
(57 kg)**

**175 lbs
(80 kg)**

**225 lbs
(102 kg)**

**275 lbs
(125 kg)**

**Estimated
Average
Requirement**

0.66 g/kg

38 g

52 g

67 g

82 g

**Recommended
Daily
Allowance**

0.8 g/kg

46 g

64 g

82 g

100 g

**Average
American
Intake**

**1.2 - 1.5 g/kg
(NHANES)**

**68-86
g**

**96-120
g**

**122-153
g**

**150-187
g**

Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems



Walter Willett, Johan Rockström, Brent Loken, Marco Springmann, Tim Lang, Sonja Vermeulen, Tara Garnett, David Tilman, Fabrice DeClerck, Amanda Wood, Malin Jonell, Michael Clark, Line J Gordon, Jessica Fanzo, Corinna Hawkes, Rami Zurayk, Juan A Rivera, Wim De Vries, Lindiwe Majele Sibanda, Ashkan Afshin, Abhishek Chaudhary, Mario Herrero, Rina Agustina, Francesco Branca, Anna Larrey, Shenggen Fan, Beatrice Crona, Elizabeth Fox, Victoria Bignet, Max Troell, Therese Lindahl, Sudhvir Singh, Sarah E Cornell, K Srinath Reddy, Sunita Narain, Sania Nishtar, Christopher J L Murray

Great Food Transformation Planetary Health Diet

January 2019

Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems



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Food Groups	Calories	% Total
Whole grains	811	32%
Legumes	426	17%
Plant oils	354	14%
Dairy	153	6%
Tree nuts	149	6%
Fruit	126	5%
All sweeteners	120	5%
Palm oil, Lard	96	4%
Beef, Pork, Chicken	92	4%
Vegetables	78	3%
Fish	40	2%
Starchy vegetables	39	1.5%
Eggs	19	<1%
	2,500	100%

79% Plants

12% Animal

**9%
Sweeteners
and Sat Fat**

	Macronutrient intake (possible range), g/day	Caloric intake, kcal/day
Whole grains*		
Rice, wheat, corn, and other†	232 (total grains 0–60% of energy)	811
Tubers or starchy vegetables		
Potatoes and cassava	50 (0–100)	39
Vegetables		
All vegetables	300 (200–600)	..
Dark green vegetables	100	23
Red and orange vegetables	100	30
Other vegetables	100	25
Fruits		
All fruit	200 (100–300)	126
Dairy foods		
Whole milk or derivative equivalents (eg, cheese)	250 (0–500)	153
Protein sources‡		
Beef and lamb	7 (0–14)	15
Pork	7 (0–14)	15
Chicken and other poultry	29 (0–58)	62
Eggs	13 (0–25)	19
Fish§	28 (0–100)	40
Legumes		
Dry beans, lentils, and peas*	50 (0–100)	172
Soy foods	25 (0–50)	112
Peanuts	25 (0–75)	142
Tree nuts	25	149
Added fats		
Palm oil	6.8 (0–6.8)	60
Unsaturated oils¶	40 (20–80)	354
Dairy fats (included in milk)	0	0
Lard or tallow	5 (0–5)	36
Added sugars		
All sweeteners	31 (0–31)	120

OMG

**Where will I get
my protein?**



**Amino acid
distribution
in plants?**

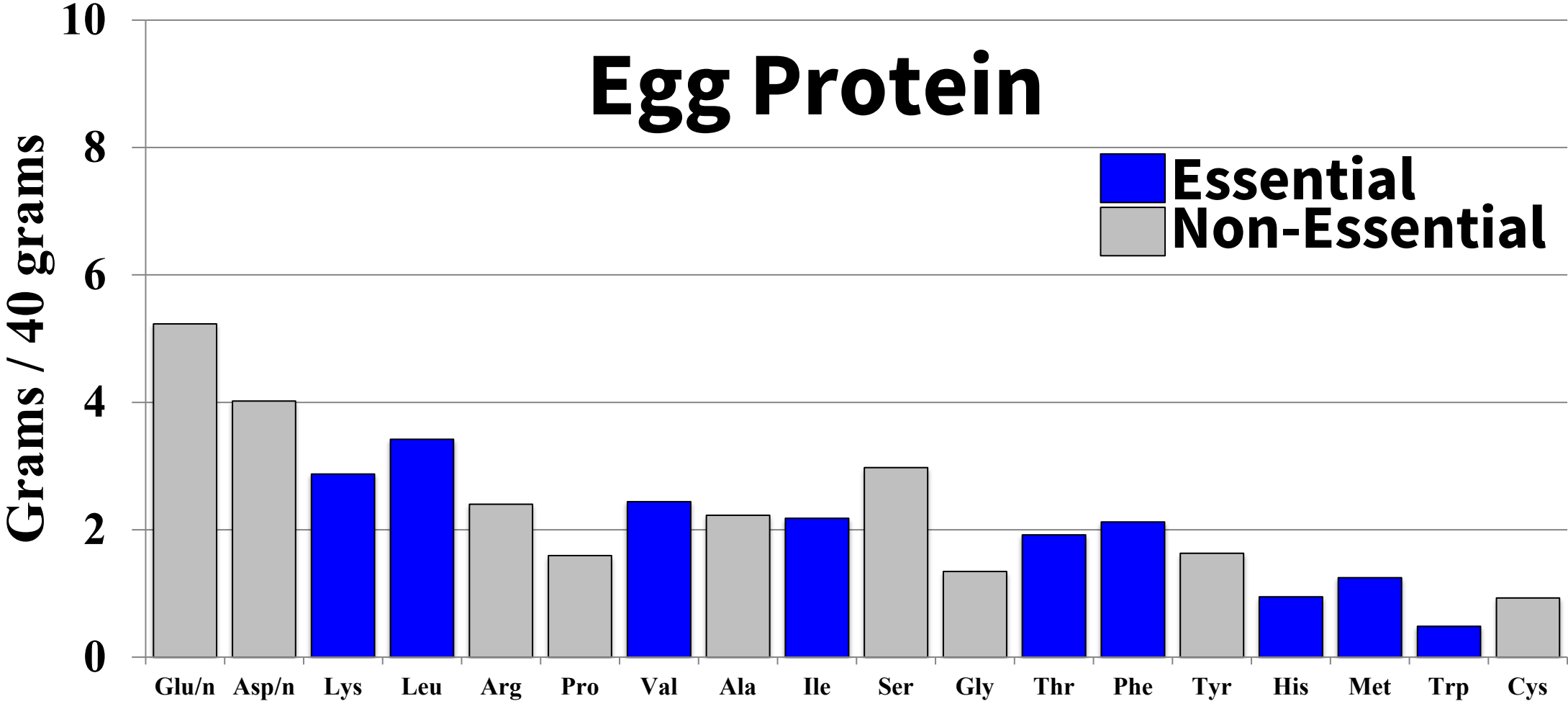
Missing?

Deficient?

Limiting?

Egg Protein

Essential
Non-Essential

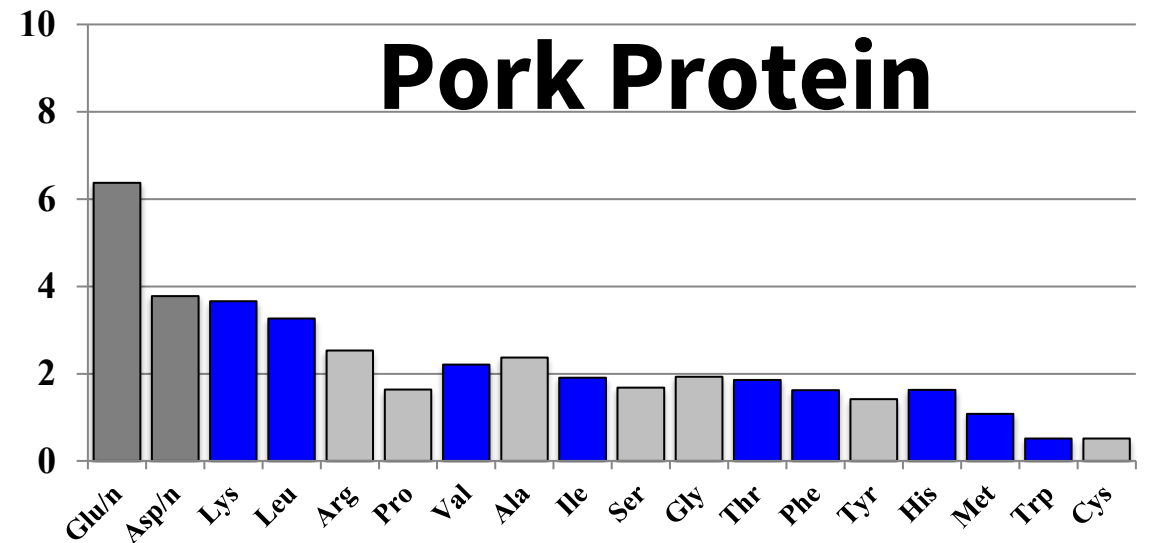
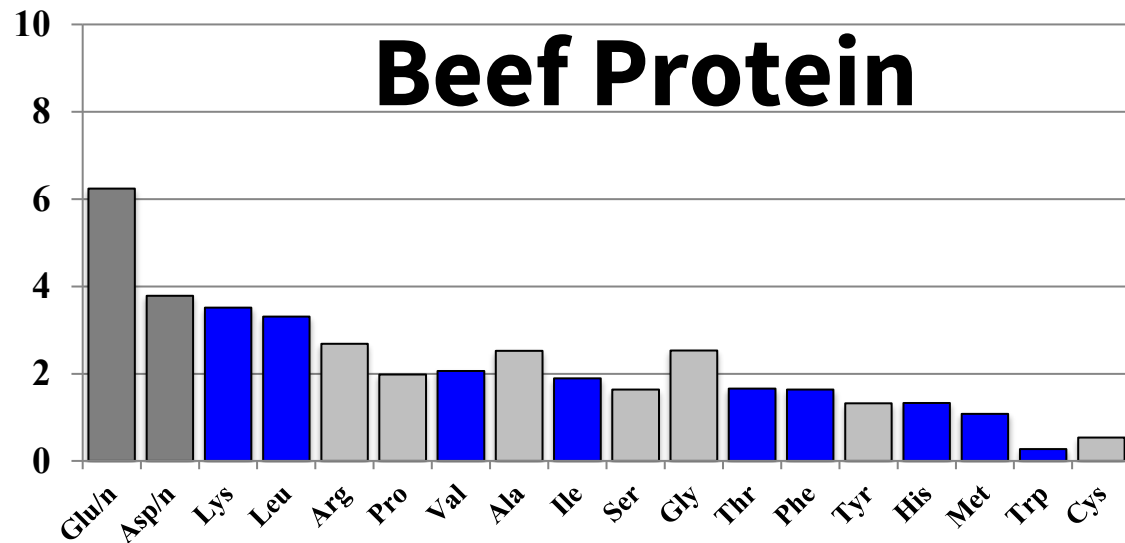
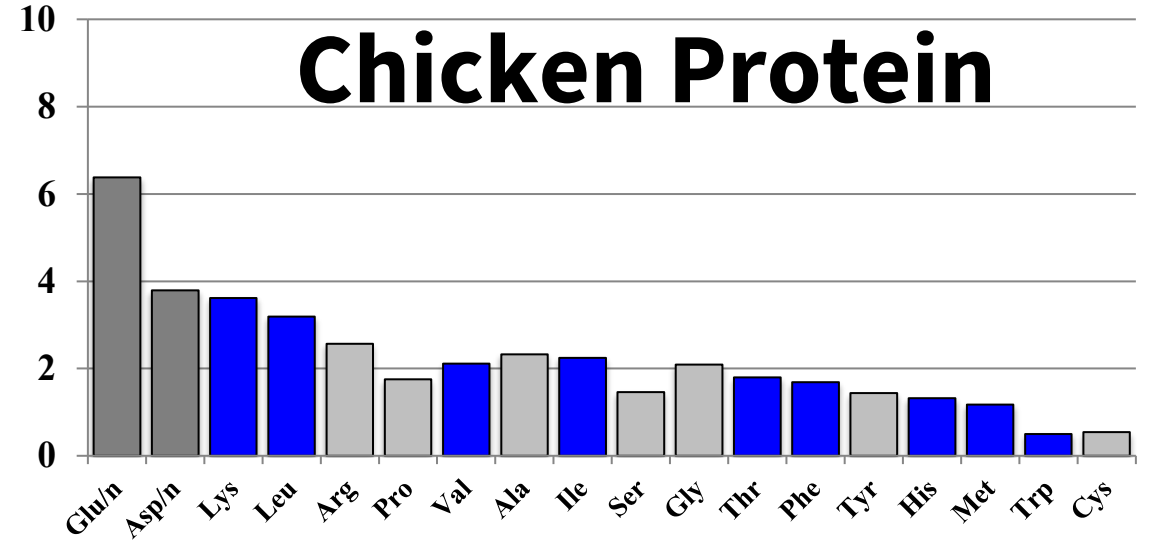
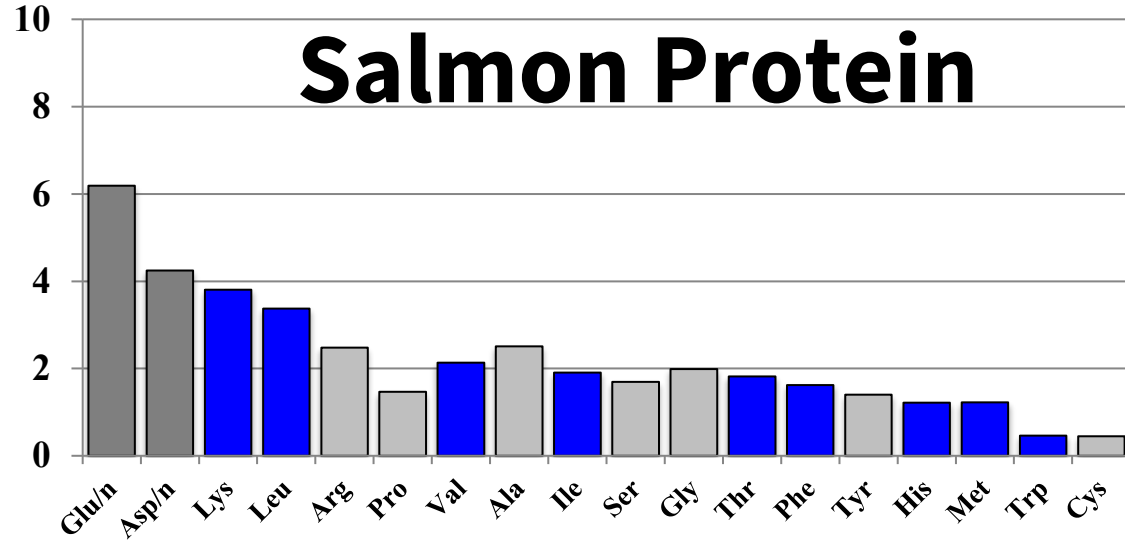


Amino Acids

Grams / 40 g protein

■ Essential

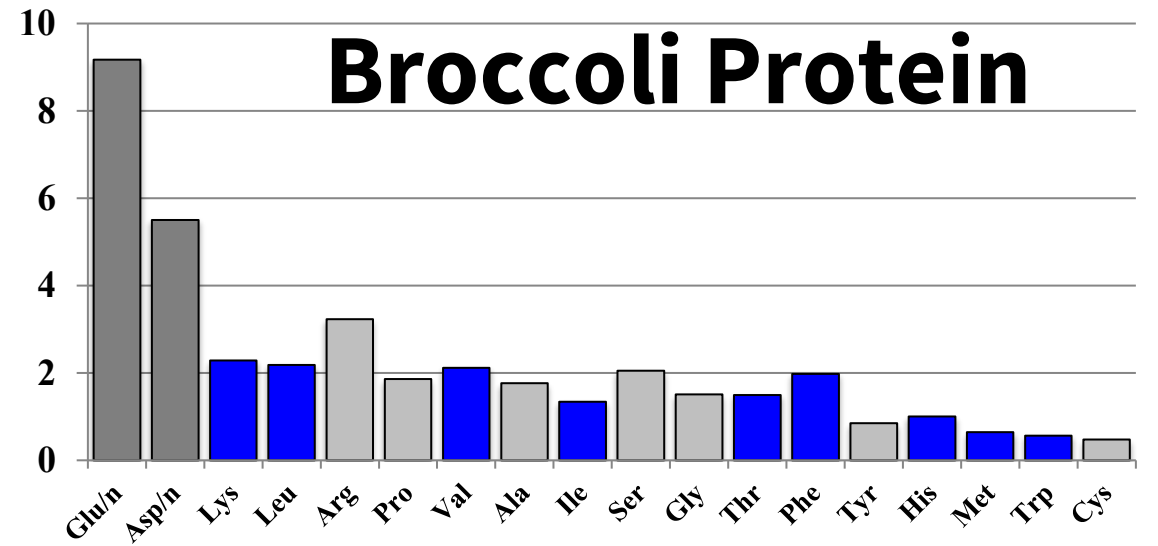
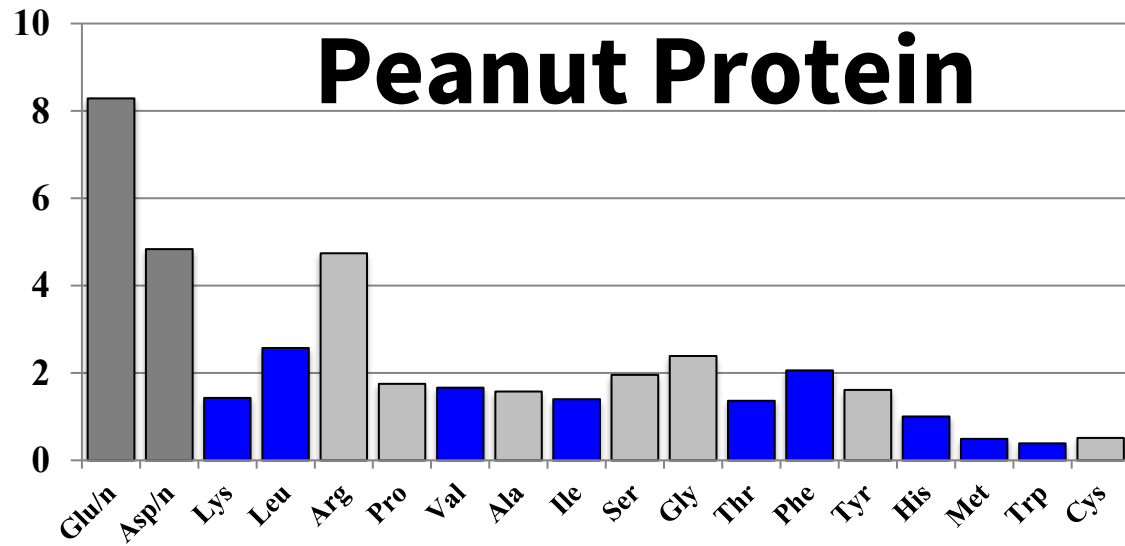
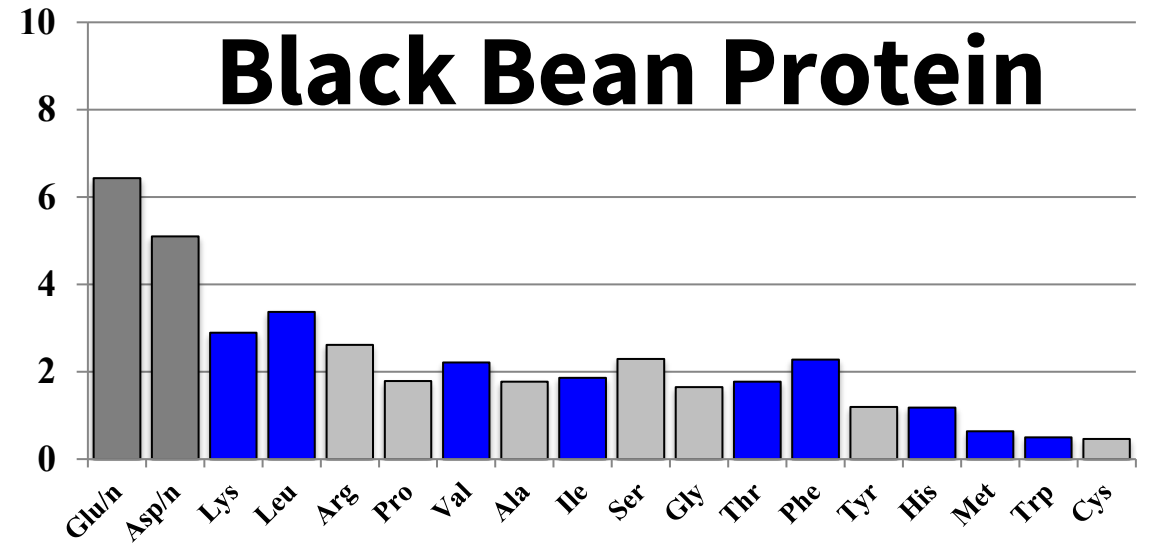
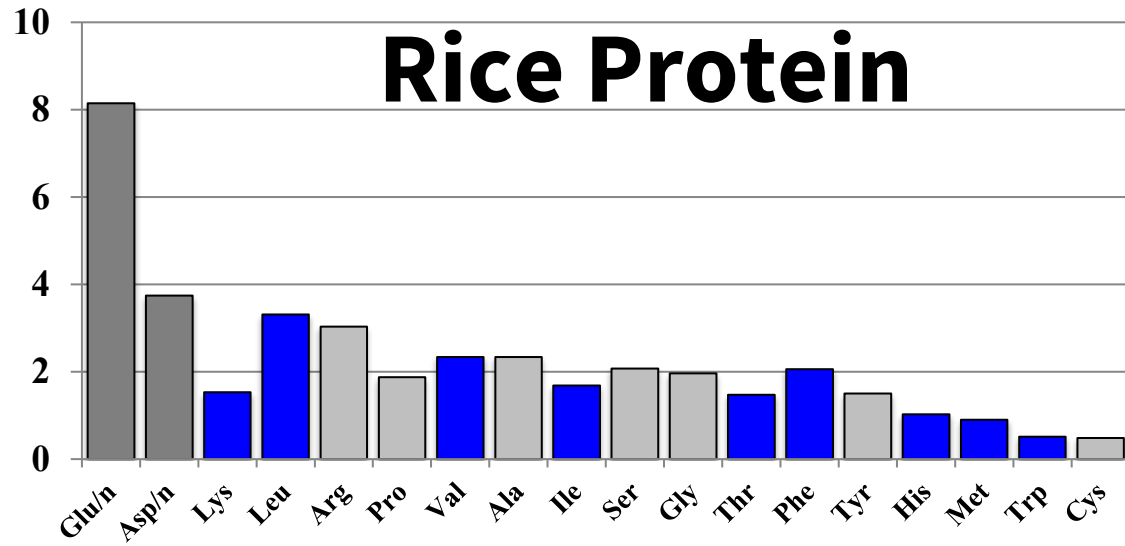
■ Non-Essential



Grams / 40 g protein

■ Essential

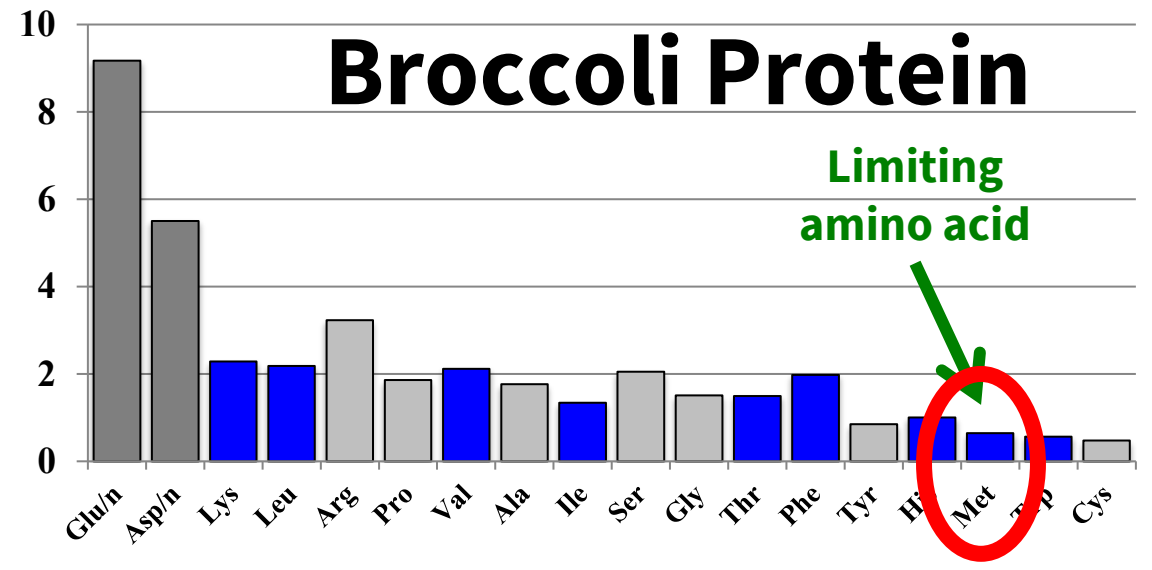
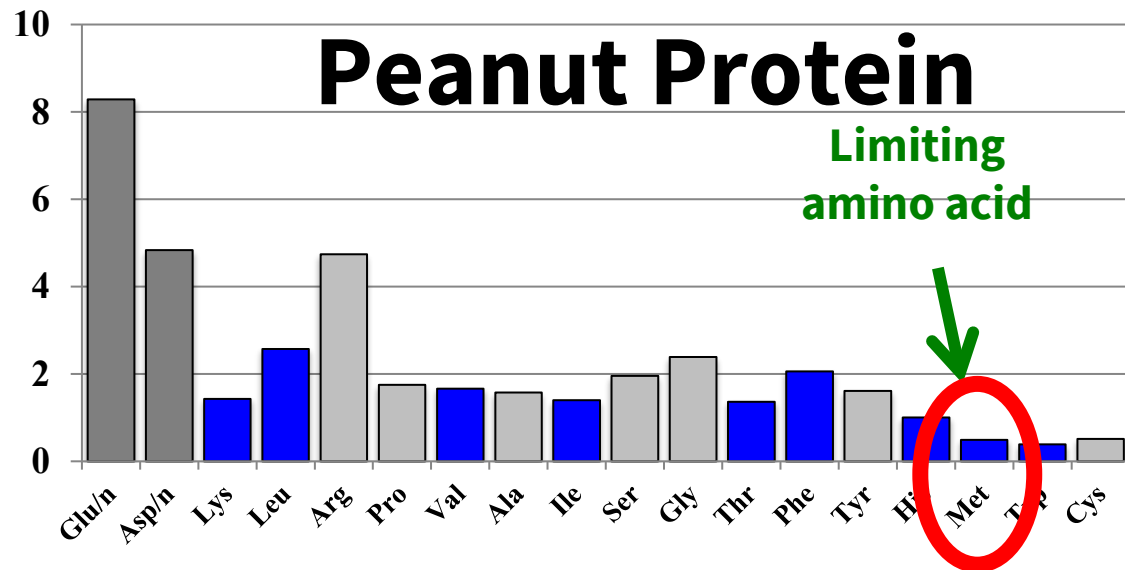
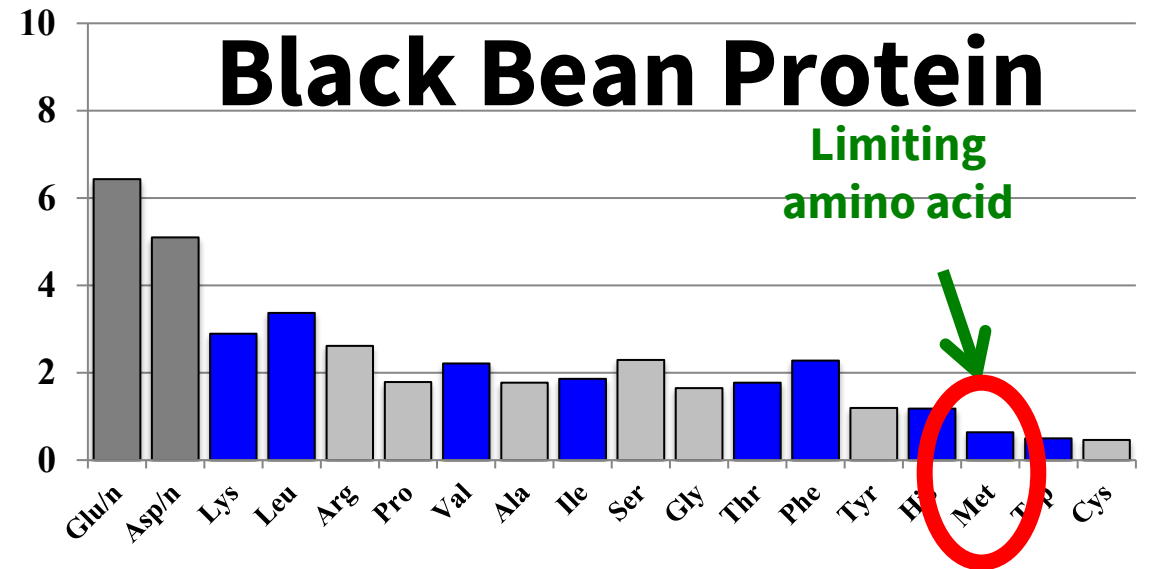
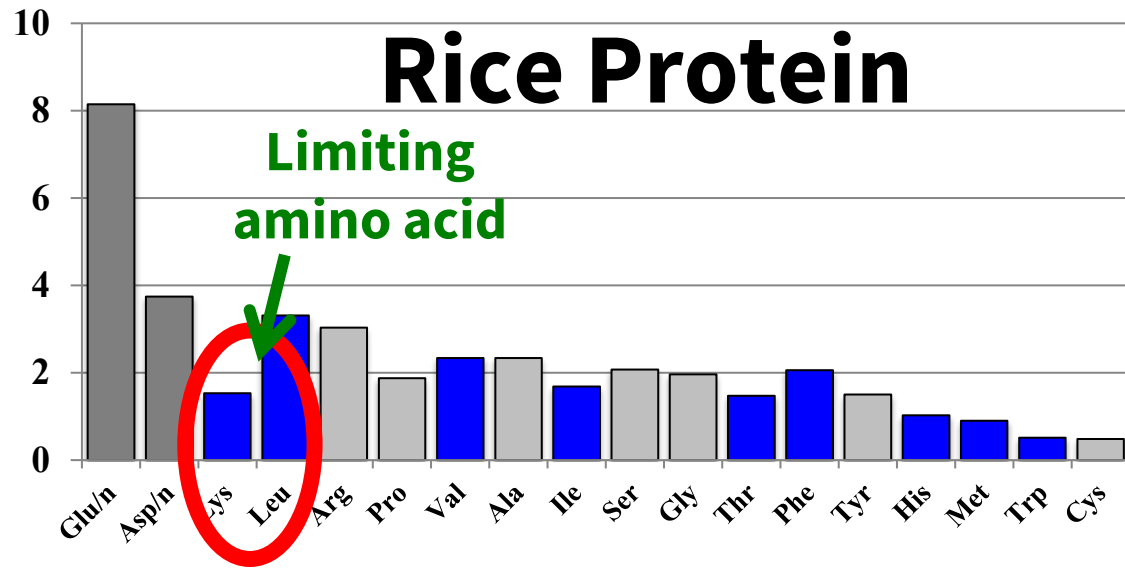
■ Non-Essential



Grams / 40 g protein

■ Essential

■ Non-Essential



Animal foods

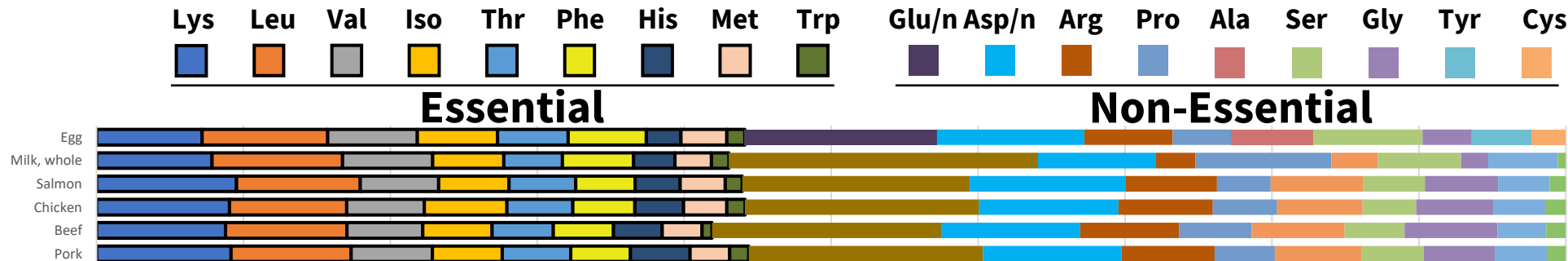


Figure 1. Proportions of amino acids in selected foods across food groups. Grouped by essential and non-essential, in descending order of prevalence within groups.

Amount of protein per 100 kcal presented in Supp Table 1.

(Source: Nutrition Database System for Research, University of Minnesota)



Essential

Non-Essential

Animal foods

Legumes, beans, lentils, peas

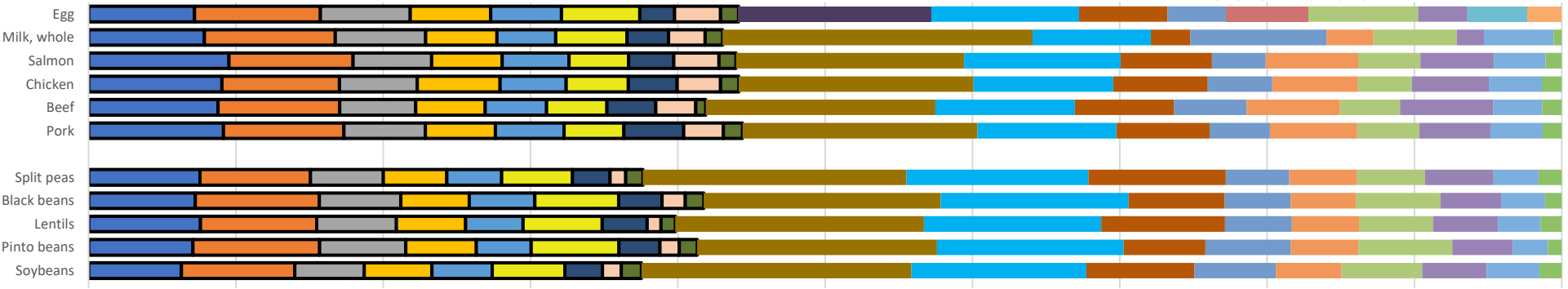


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Essential

Non-Essential

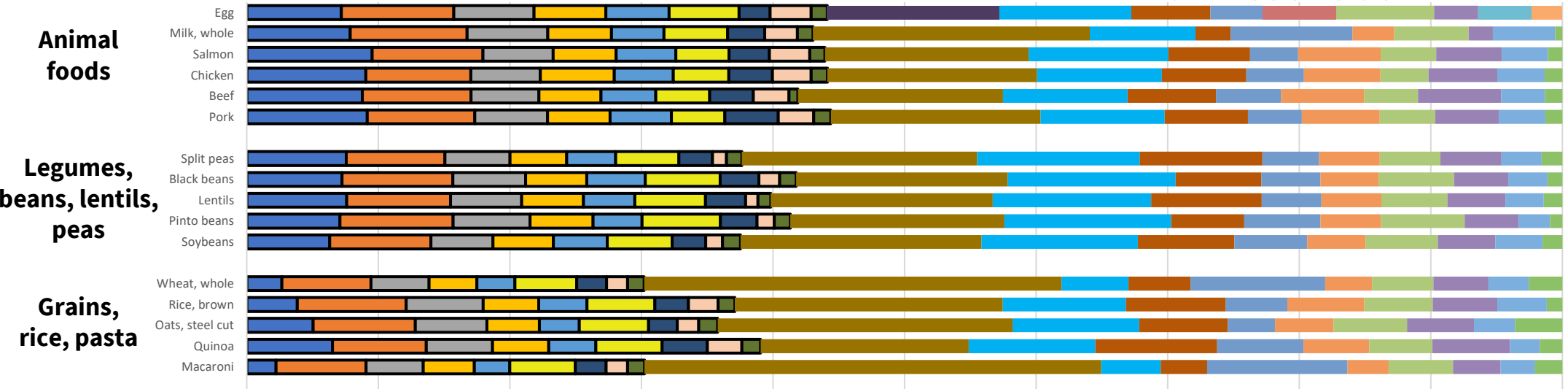


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Non-Essential

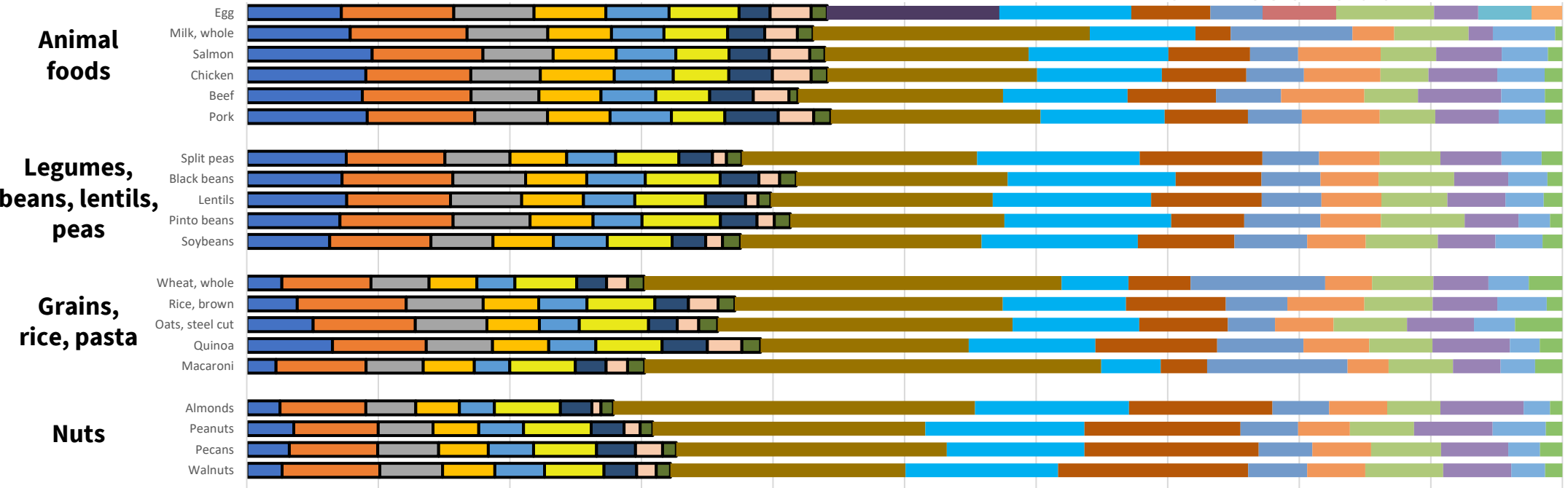


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Lys **Leu** **Val** **Iso** **Thr** **Phe** **His** **Met** **Trp**
Glu/n **Asp/n** **Arg** **Pro** **Ala** **Ser** **Gly** **Tyr** **Cys**

Essential

Non-Essential

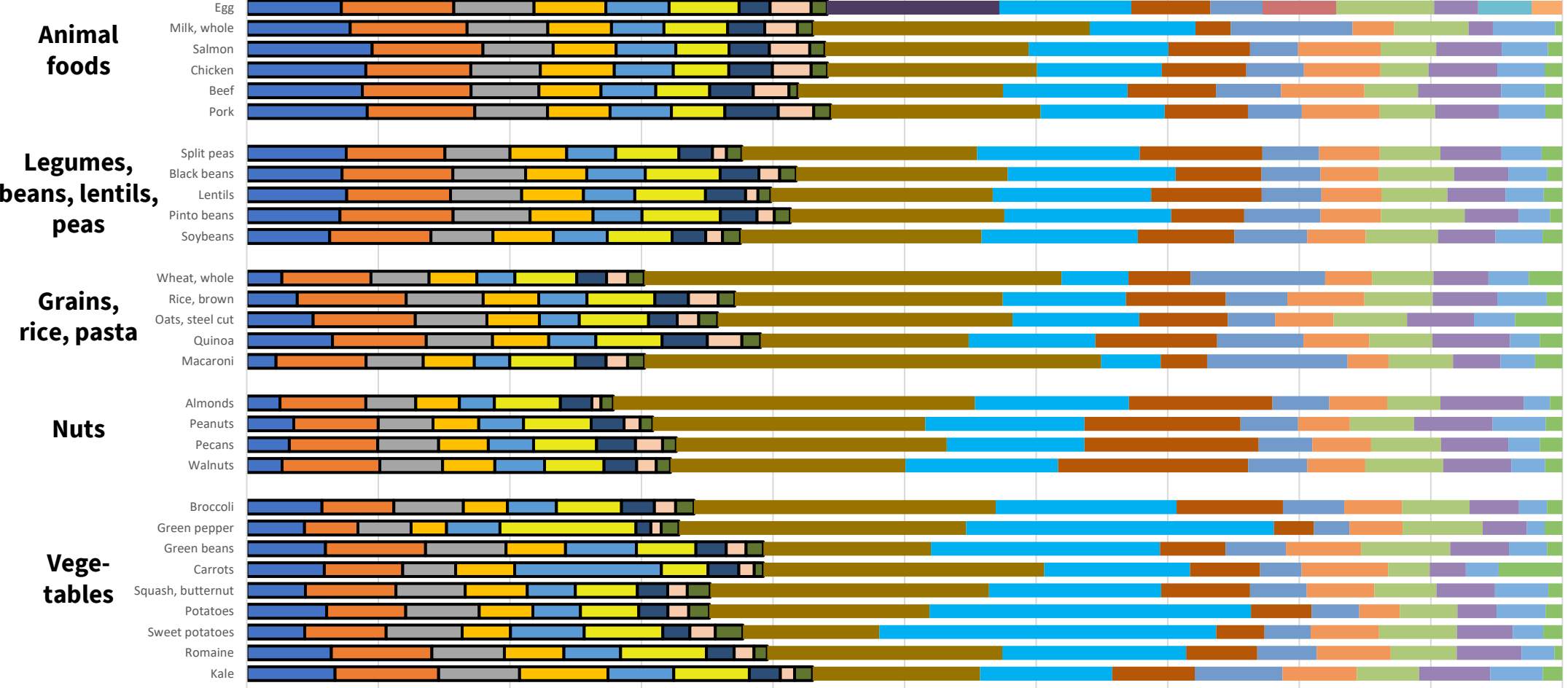


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Essential

Non-Essential

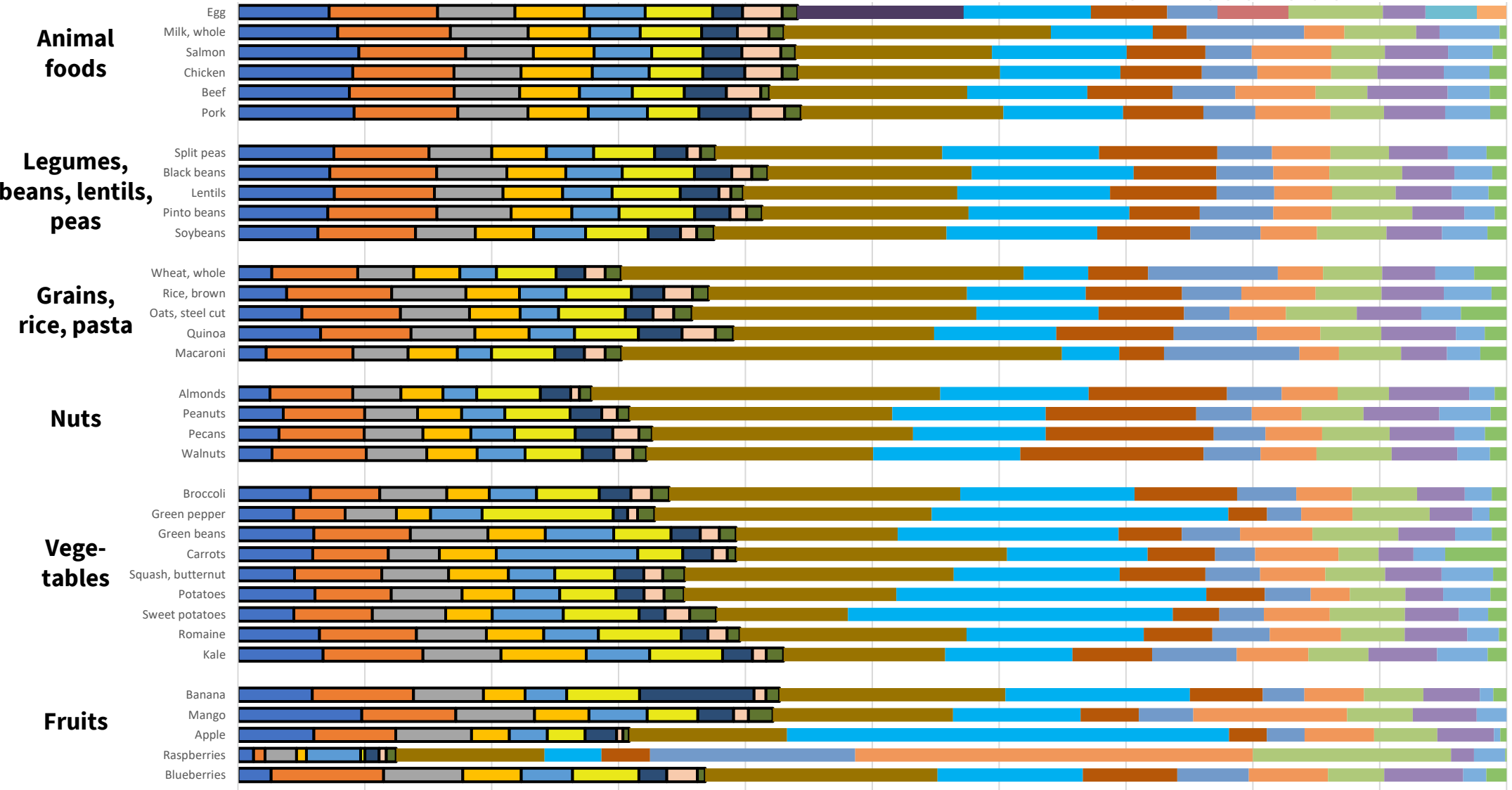


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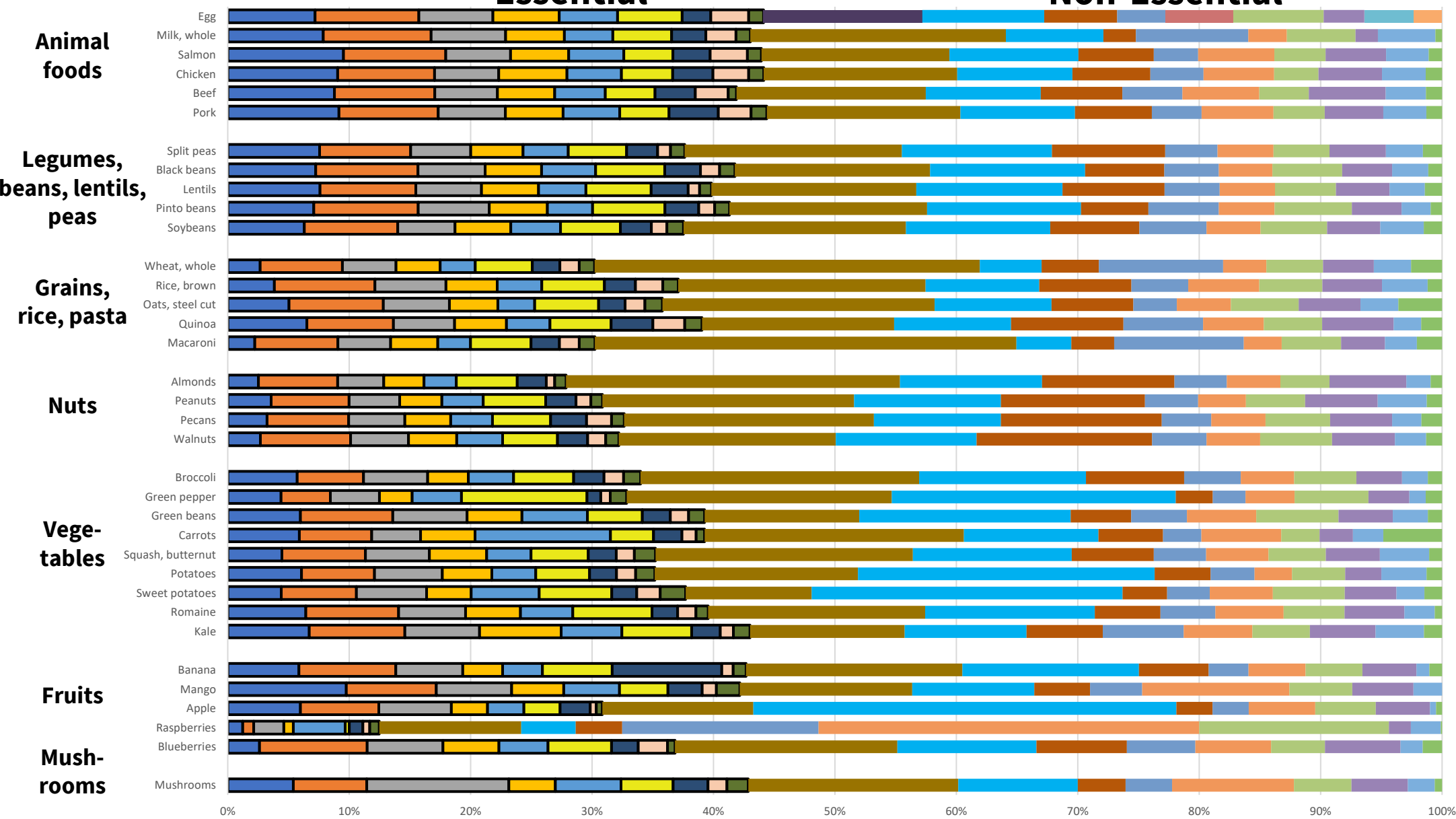
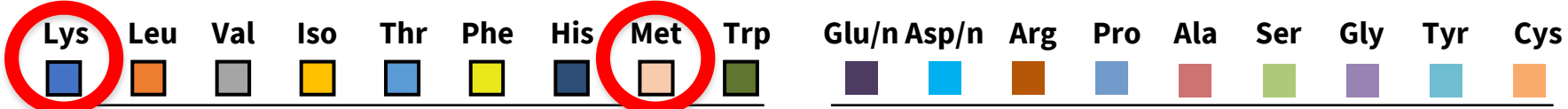


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Non-Essential

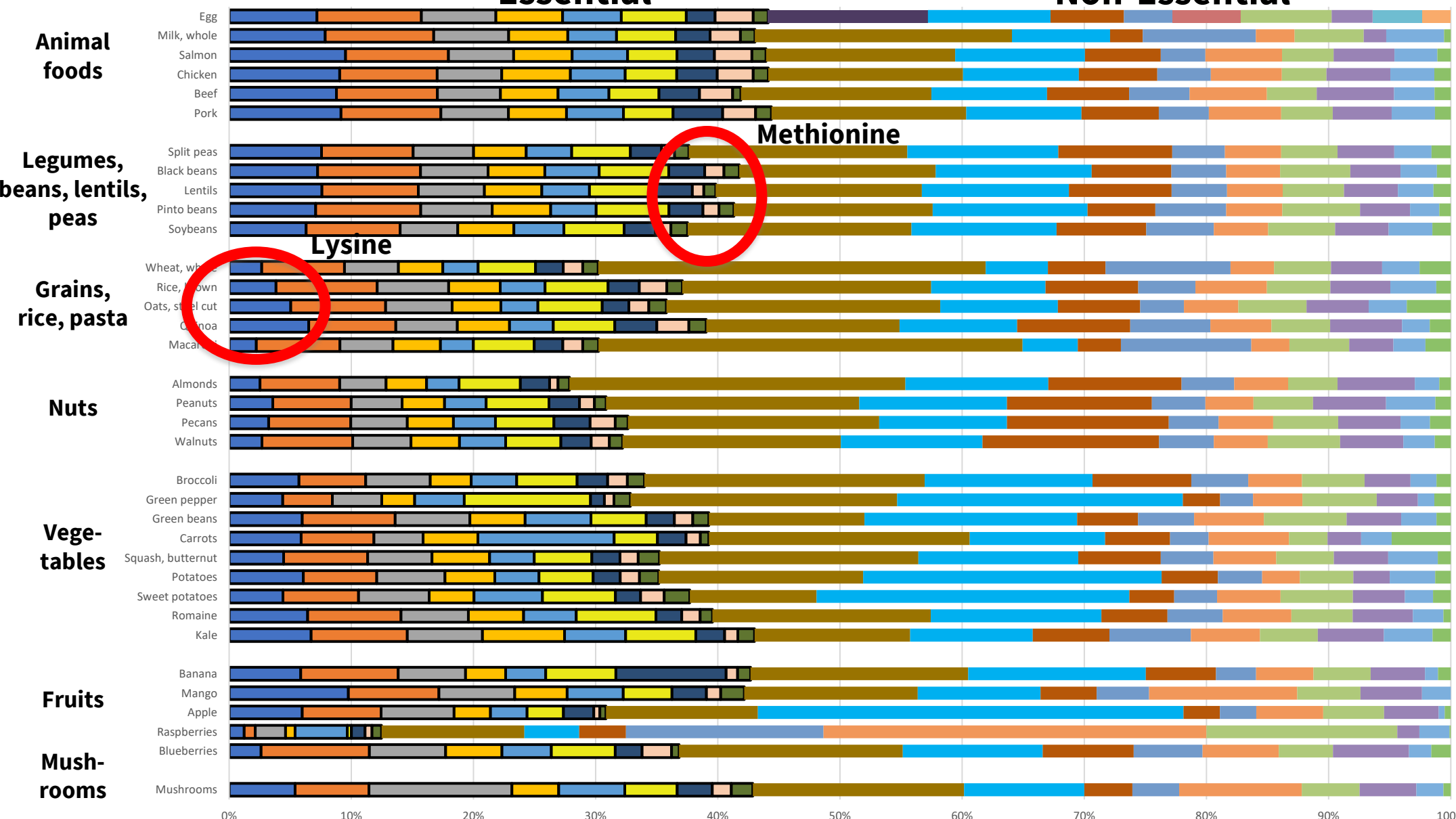


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Food Proteins: Quality, Use, and Need

“Concern about the quality of individual food proteins is of only theoretical interest in settings where food is abundant. Most people in the US and Canada eat a variety of nutritious foods to meet their energy needs – not just say, cookies, potato chips or alcoholic beverages. They would find it next to impossible not to meet their protein requirements, even if they were to eat no meat, fish, poultry, eggs, or cheese.”

Lead Article

Maximizing the intersection of human health and the health of the environment with regard to the amount and type of protein produced and consumed in the United States

Christopher D. Gardner, Jennifer C. Hartle, Rachael D. Garrett, Lisa C. Offringa, and Arlin S. Wasserman



2019 Apr 1;77(4):197-215

A

CURRENT SCENARIO

90 grams protein

85:15 animal:plant

~800 kcal



*** Note: The proportions of bread, nuts and beans presented here are representative of current average daily American diet.**

D

SHIFT SCENARIO #3

67.5 grams protein (25% decrease)

60:40 animal:plant

~775 kcal



* Note: Decision to achieve increase in plant protein by increasing nuts & beans but not bread was intentional. American daily bread intake already very high.

A**CURRENT SCENARIO**

90 grams protein

85:15 animal:plant

~800 kcal



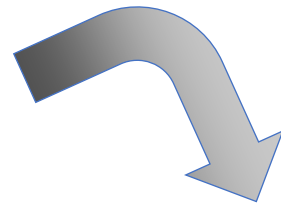
* Note: The proportions of bread, nuts and beans presented here are representative of current average daily American diet.

A Day's Worth of Protein on One Plate

Calories on both plates are similar, ~800 kcals (~33% of total kcals for a 2,500 kcal diet)

Since all whole foods have protein, additional foods would provide additional protein

25% less protein



Shift 25% from animal to plant

D**SHIFT SCENARIO #3**

67.5 grams protein (25% decrease)

60:40 animal:plant

~775 kcal



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- 1. Reduce protein intake by 25%**
Still exceeds RDA, RDA has safety buffer

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Plant protein quality higher than many people believe

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- 1. Reduce protein intake by 25%**
Still exceeds RDA, RDA has safety buffer
- 2. Shift from 85:15 to 60:40 animal:plant**
Plant protein quality higher than many people believe
- 3. >300 M people in United States**

Maximizing the intersection of human health and the health of the environment with regard to the amount and type of protein produced and consumed in the United States

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Plant protein quality higher than many people believe
- 3. >300 M people in United States**
- 4. Green House Gas Emissions decrease 40%**
129 B Kg CO₂_{eq}
8% pledged under Paris Agreement

Maximizing the intersection of human health and the health of the environment with regard to the amount and type of protein produced and consumed in the United States

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Plant protein quality higher than many people believe
- 3. >300 M people in United States**
- 4. Green House Gas Emissions decrease 40%**
129 B Kg CO₂_{eq}
8% pledged under Paris Agreement
- 5. Consumptive Water Use decrease 10%**
3.1 T gallons



Scientific Report of the 2015 Dietary Guidelines Advisory Committee

Advisory Report to the Secretary of Health and Human Services
and the Secretary of Agriculture

Executive Summary

...regarding sustainable diets... a diet higher in plant-based foods, such as vegetables, fruits, whole grains, legumes, nuts, and seeds, and lower in calories and animal-based foods is more health promoting and is associated with less environmental impact than is the current U.S. diet.

People, Planet, Protein

Reality Check

Thank you



@GardnerPhD

The Case to Carpe DIEM

Quantifying **Dietary Impacts** on **Environmental Measures**

David L. Katz, MD, MPH



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Outline

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[Evaluation of the hypothesis](#)

[Discussion](#)

[Conclusion](#)

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ELSEVIER

Medical Hypotheses

Volume 140, July 2020, 109644



Dietary assessment can be based on pattern recognition rather than recall

D.L. Katz ^a ¹ , L.Q. Rhee ^a, C.S. Katz ^a, D.L. Aronson ^a, G.C. Frank ^b, C.D. Gardner ^c, W.C. Willett ^d, M.L. Dansinger ^e

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<https://doi.org/10.1016/j.mehy.2020.109644>

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Abstract

✓ SCREENERS

ID

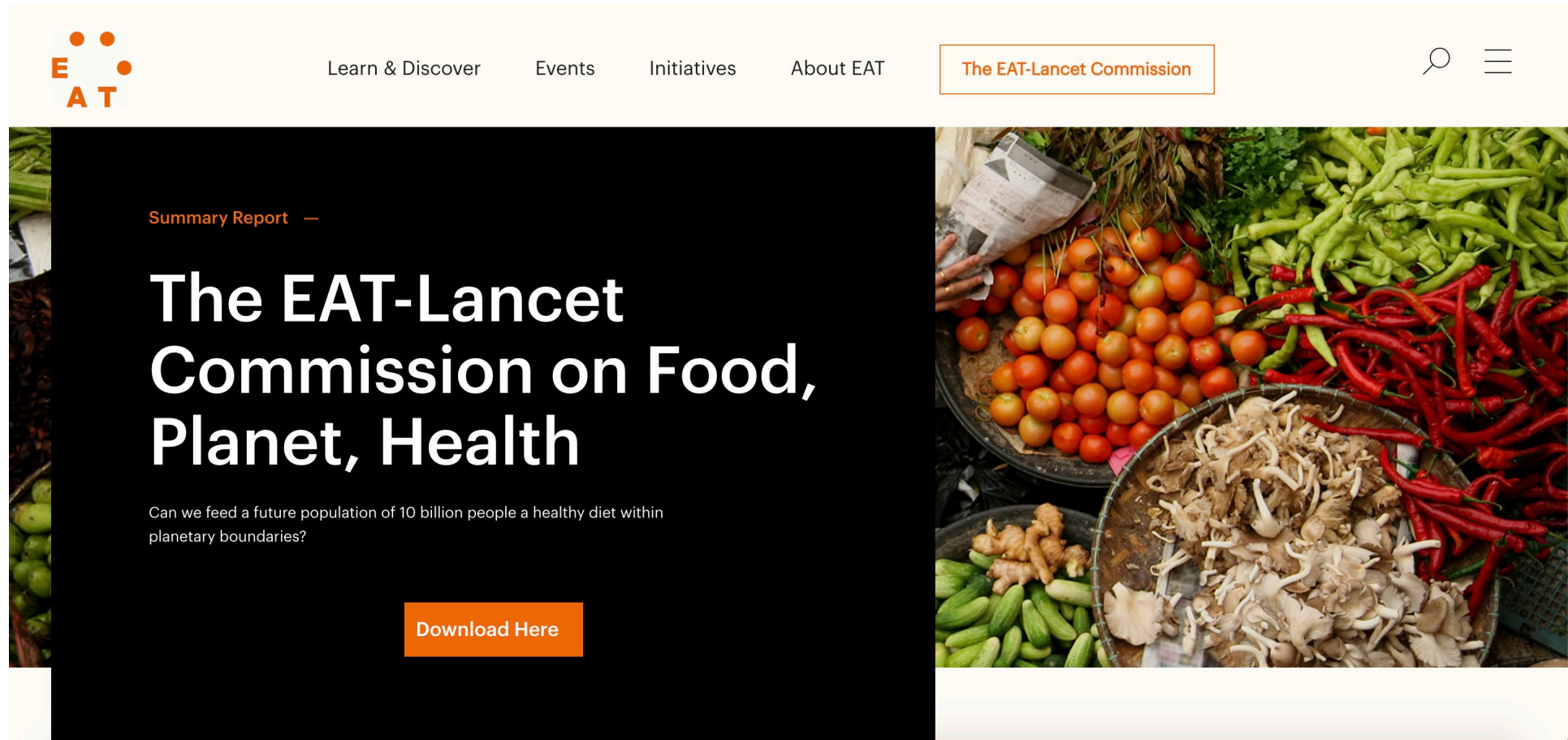
IDEAL

Find your Diet ID

Which one of these images better represents the foods you typically eat?



Including the choice of a grand confluence -



The image shows a screenshot of the EAT website. At the top left is the EAT logo, consisting of the letters 'E' and 'A' stacked vertically with 'T' to the right, and three orange dots above the 'E'. To the right of the logo are navigation links: 'Learn & Discover', 'Events', 'Initiatives', and 'About EAT'. A search icon and a menu icon (three horizontal lines) are on the far right. A highlighted orange box contains the text 'The EAT-Lancet Commission'. Below the navigation is a large banner. The left side of the banner has a black background with white text: 'Summary Report —', 'The EAT-Lancet Commission on Food, Planet, Health', and 'Can we feed a future population of 10 billion people a healthy diet within planetary boundaries?'. An orange button with the text 'Download Here' is at the bottom right of the black area. The right side of the banner features a photograph of fresh produce, including green beans, red and green chili peppers, mushrooms, and cucumbers.

EAT

Learn & Discover Events Initiatives About EAT

The EAT-Lancet Commission

Summary Report —

The EAT-Lancet Commission on Food, Planet, Health

Can we feed a future population of 10 billion people a healthy diet within planetary boundaries?

Download Here

RESEARCH ARTICLE

Multiple health and environmental impacts of foods

 Michael A Clark, Marco Springmann,  Jason Hill, and  David Tilman

[+ See all authors and affiliations](#)

PNAS November 12, 2019 116 (46) 23357–23362; first published October 28, 2019;
<https://doi.org/10.1073/pnas.1906908116>

Contributed by David Tilman, September 24, 2019 (sent for review April 23, 2019; reviewed by Tim G. Benton and Joan Sabate)

[Article](#)[Figures & SI](#)[Info & Metrics](#)[PDF](#)

Significance

Dietary choices are a leading global cause of mortality and environmental degradation and threaten the attainability of the UN's Sustainable Development Goals and the Paris Climate Agreement. To inform decision making and to better identify the multifaceted health and environmental impacts of dietary choices, we describe how consuming 15 different food groups is associated with 5 health outcomes and 5 aspects of environmental degradation.

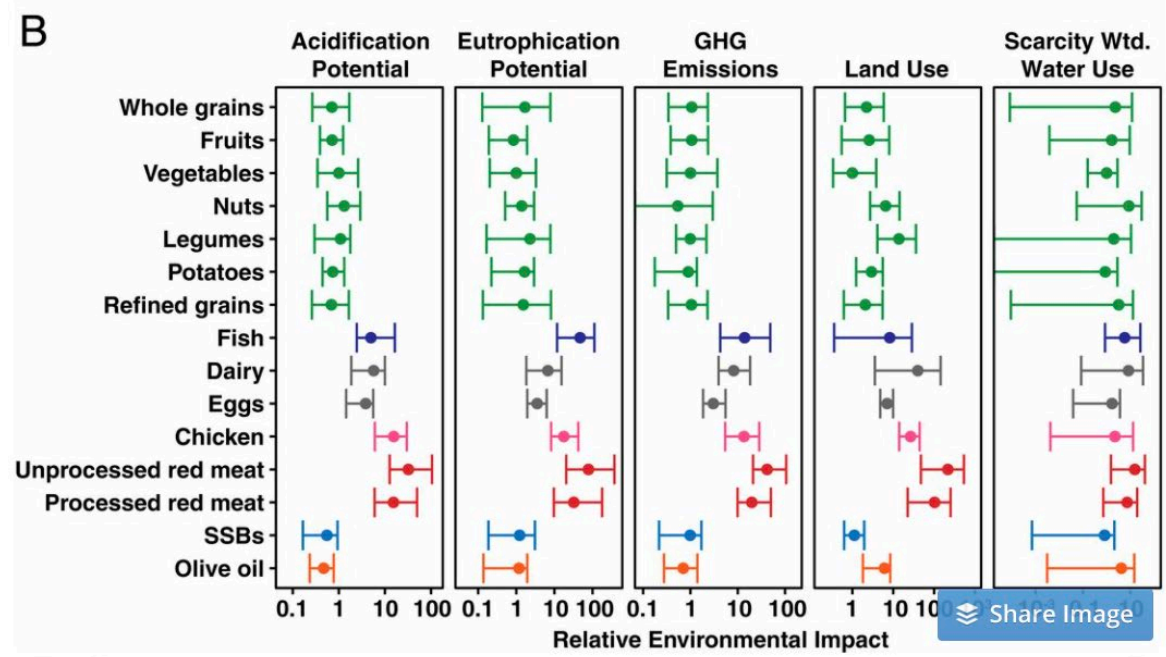
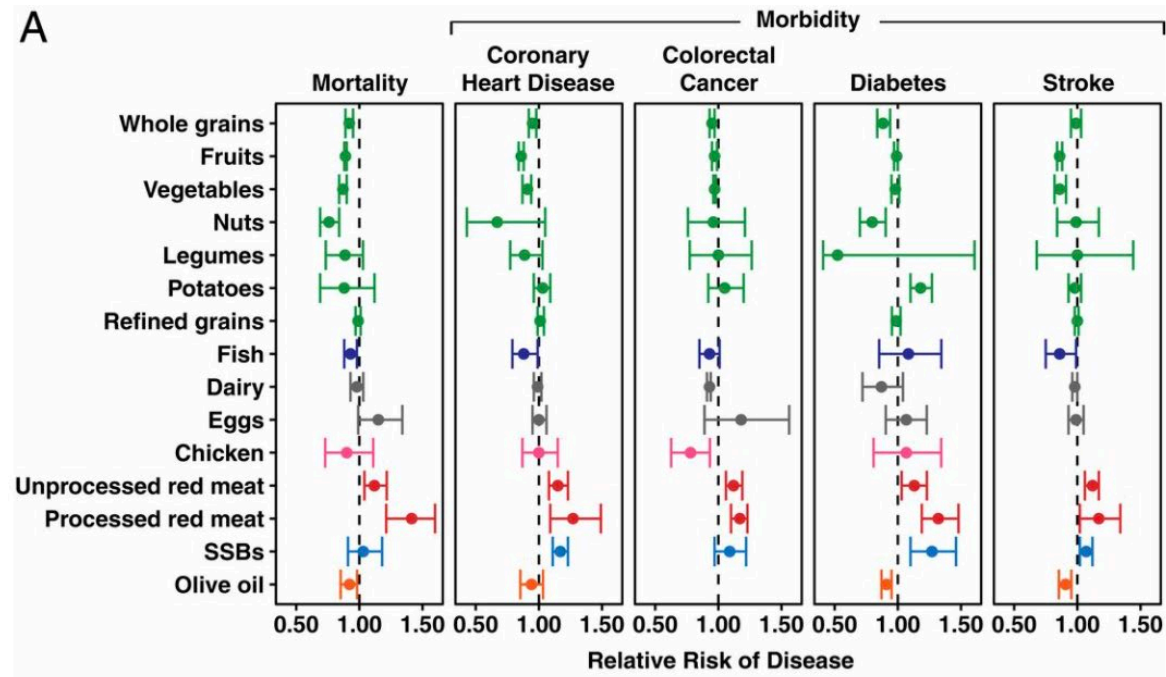
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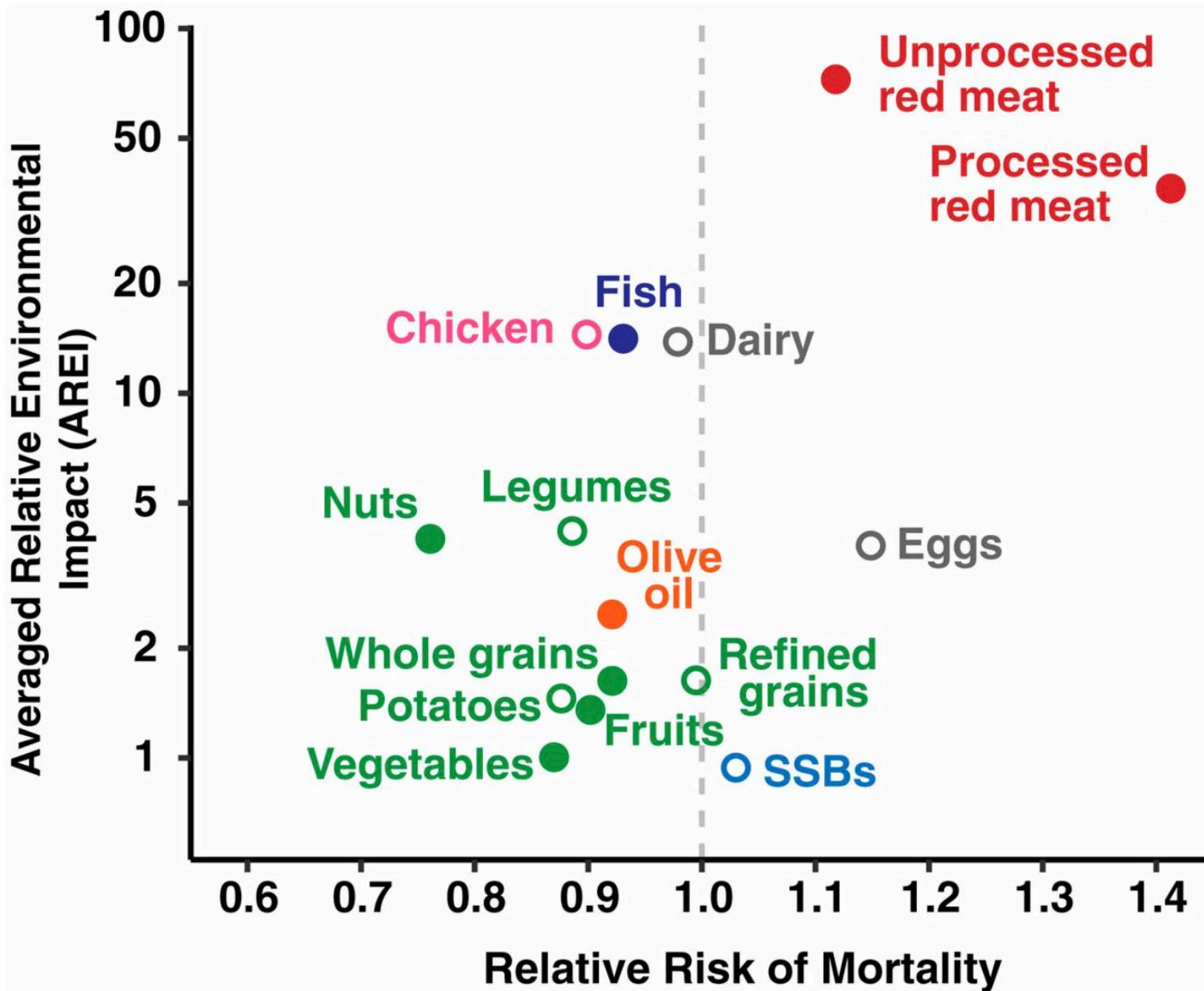
ARTICLE CLASSIFICATIONS

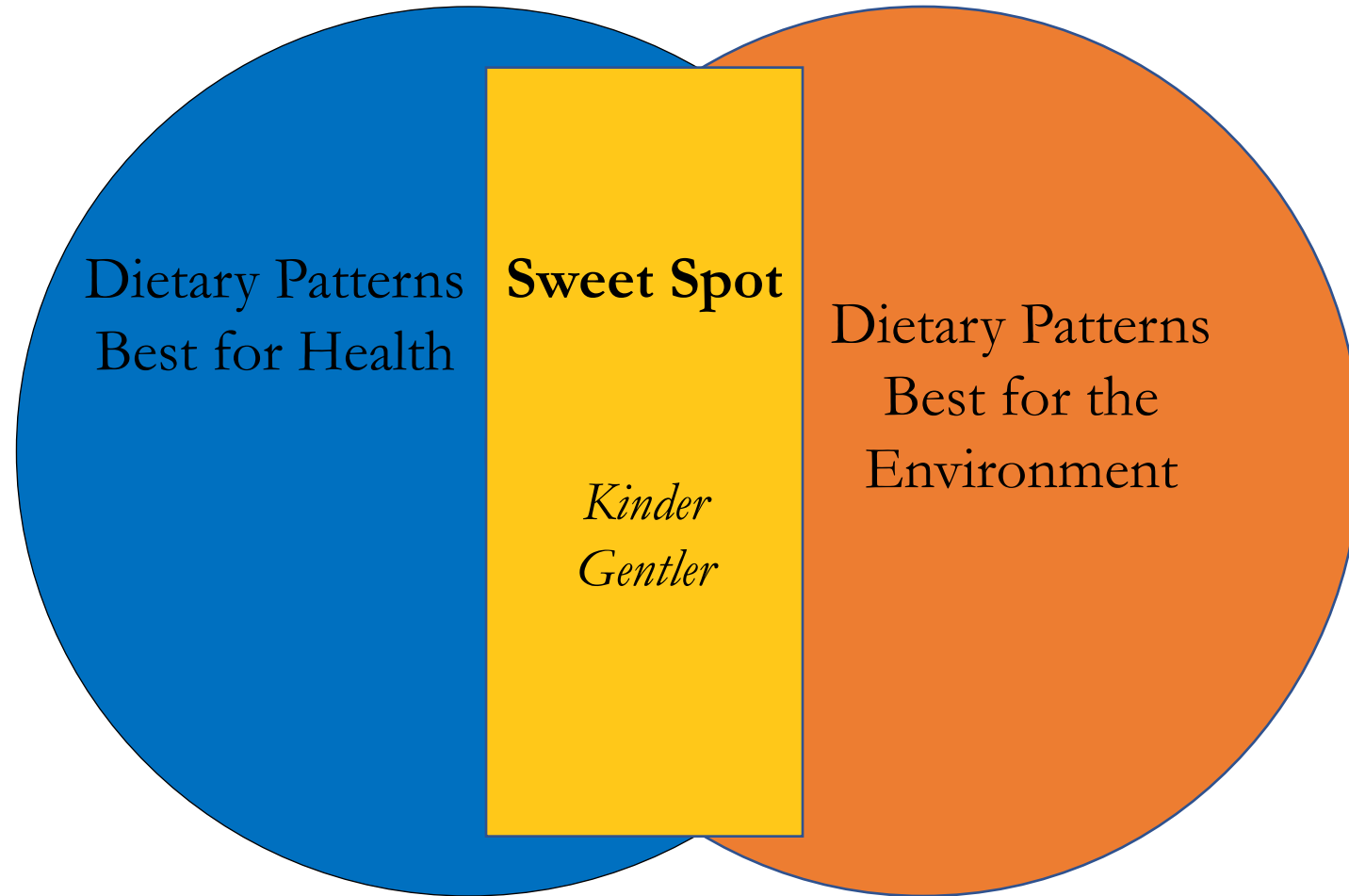
Biological Sciences » [Sustainability Science](#)

Social Sciences » [Sustainability Science](#)

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Dietary Patterns
Best for Health

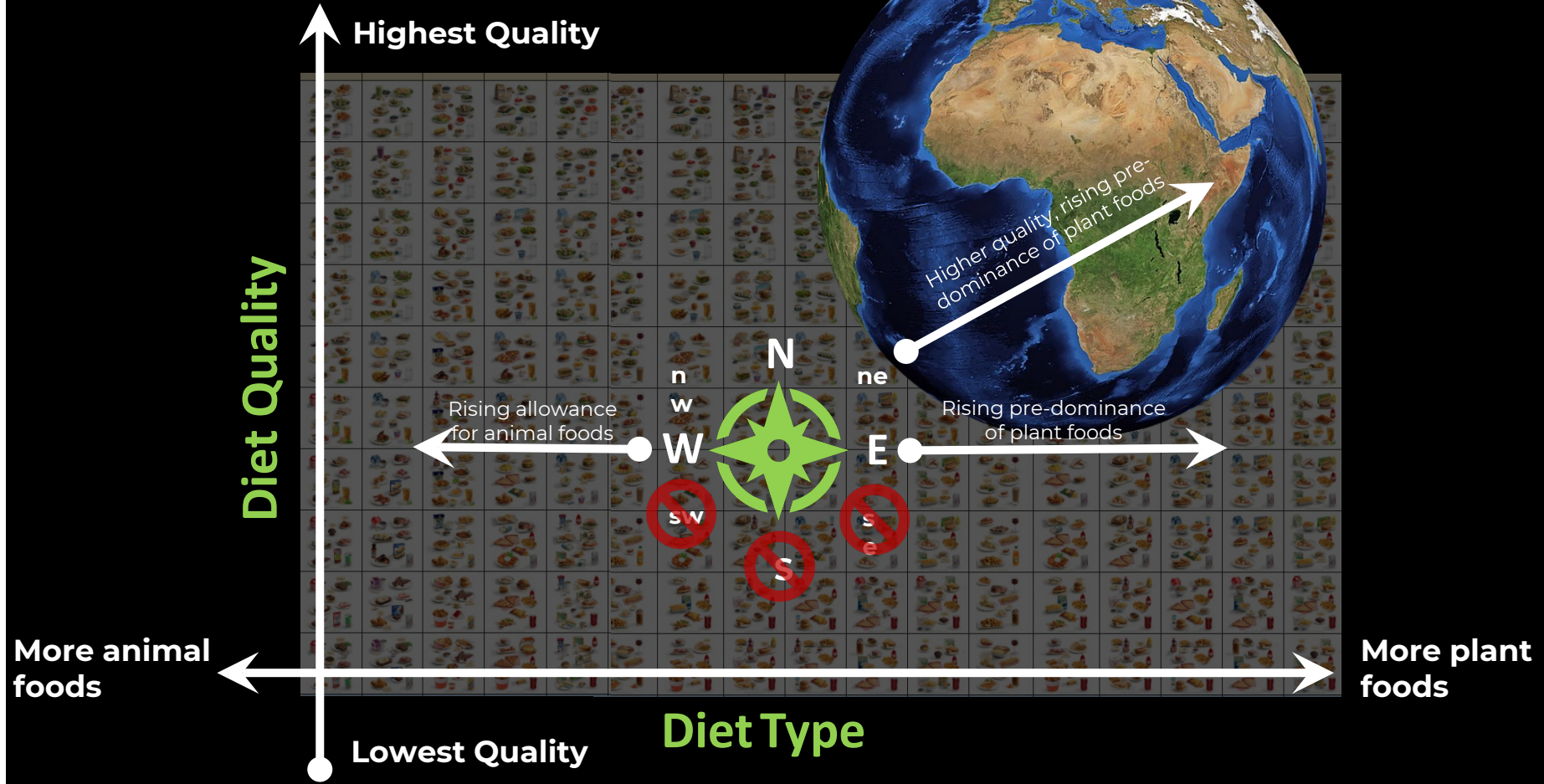
Sweet Spot

Dietary Patterns
Best for the
Environment

Kinder
Gentler



Diet Map Visual: Impact of diet on human + planetary health



The DIEM Project

Dietary Impacts on Environmental Measures

Marie Janiszewski

Harvard T.H. Chan School of Public Health, Nutrition Department

Nurse's Health Study Food Frequency Questionnaire

Gidon Eshel, Ph.D. – Harvard Radcliffe Institute

Environmental Indicators: Land Use, Water Use, GHGEs, and Reactive Nitrogen Use

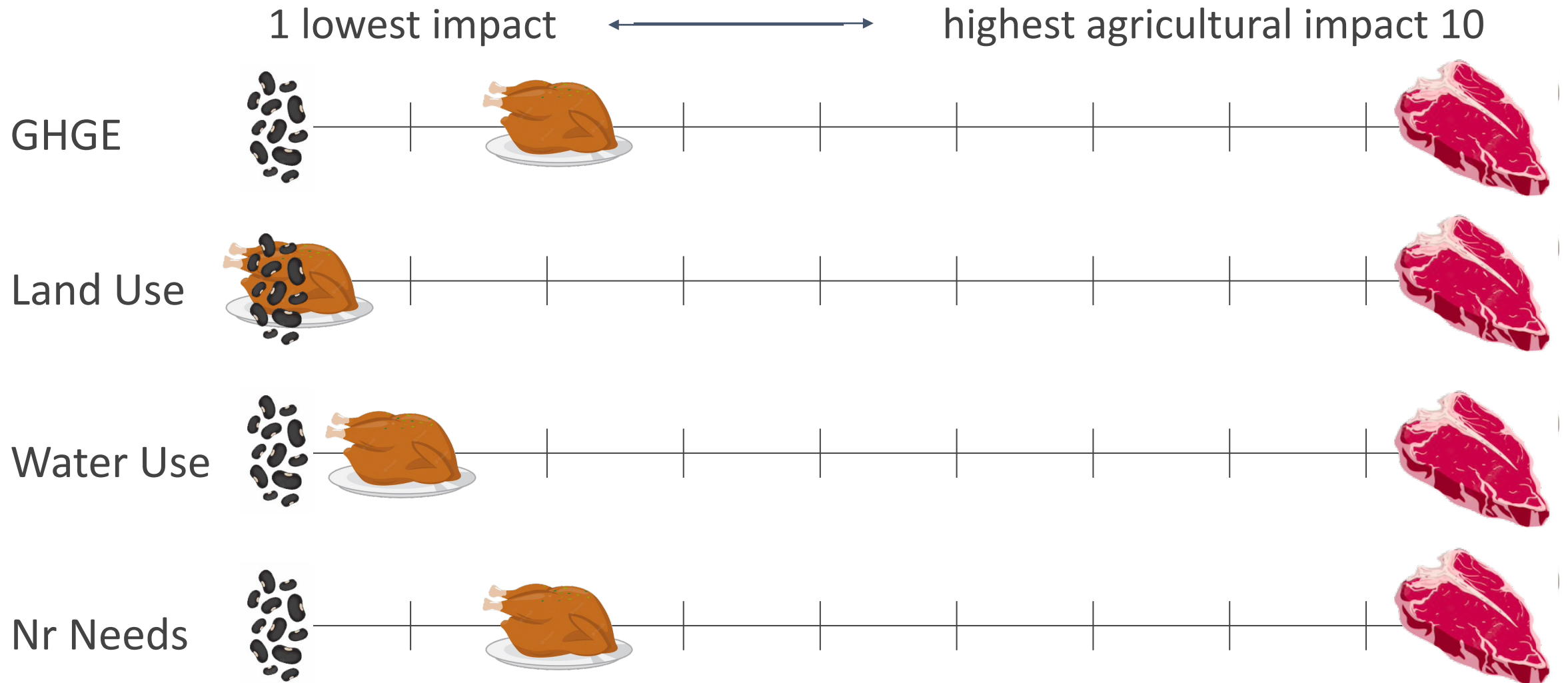
Martin Heller, Ph.D. – Center for Sustainable Systems

Regional impact of water footprints

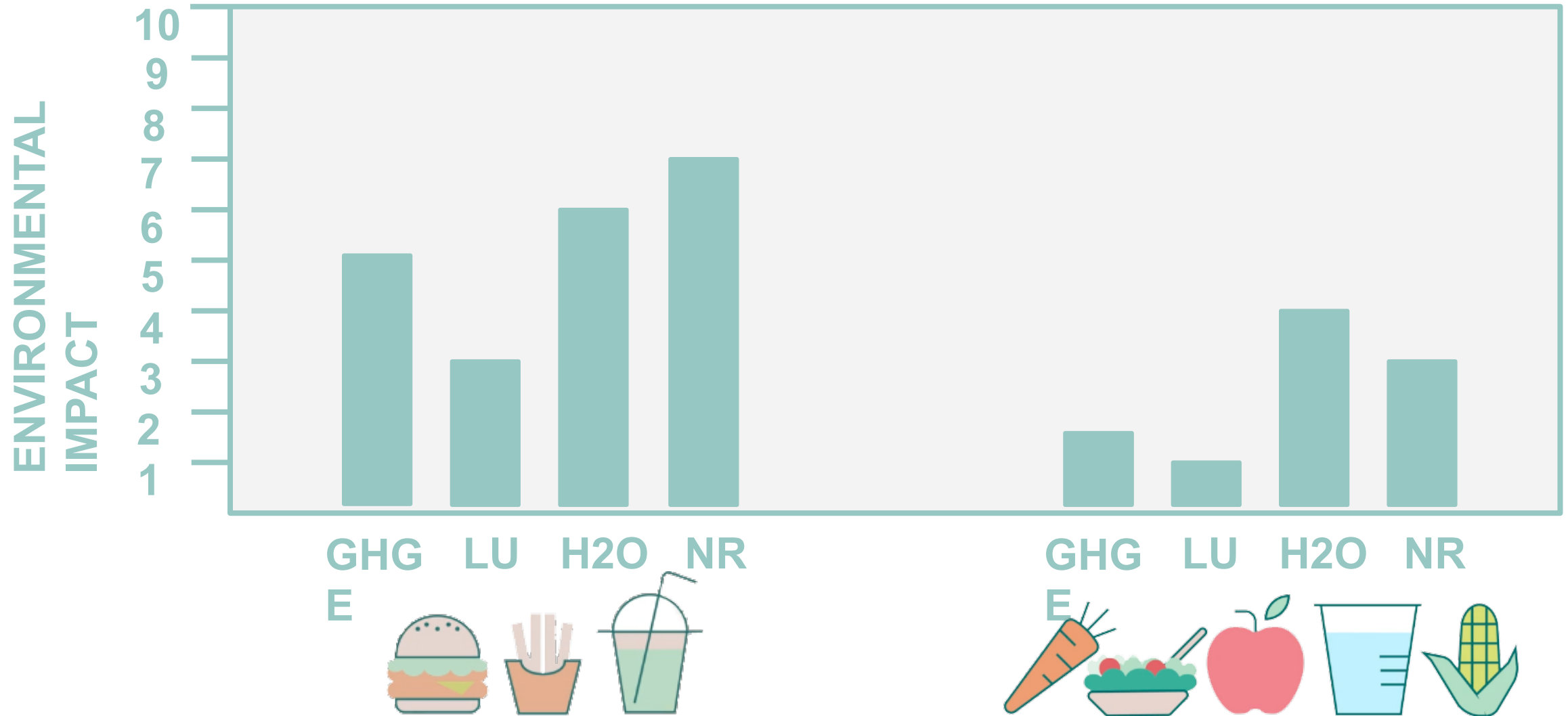
Single Environmental Score



Food Item Scoring



Dietary Pattern Scoring



The future of DIEM



Thank you -

It's not what we don't know about diet that most threatens our health; it's the constant, wild misrepresentations of what we do know.



DKatz@DietID.com

Questions and Discussion

Please submit your questions using the Q&A tool in Zoom.