

# U.S. Dietary Guidelines: Sustainability of the Three Healthy Eating Patterns

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## Introduction

The *Dietary Guidelines for Americans* (DGA) are the foundation of nutrition policy in the U.S.—guiding billions of dollars in federal spending, shaping the food industry, and informing consumer education. Recent efforts have been attempted to incorporate sustainability into their development to promote long-term food security. At the same time, the sustainability of the current DGA are unclear.

**Objective:** assess the environmental impacts of the three healthy diet patterns recommended in the 2015-2020 DGA using a life cycle approach.

## Methods

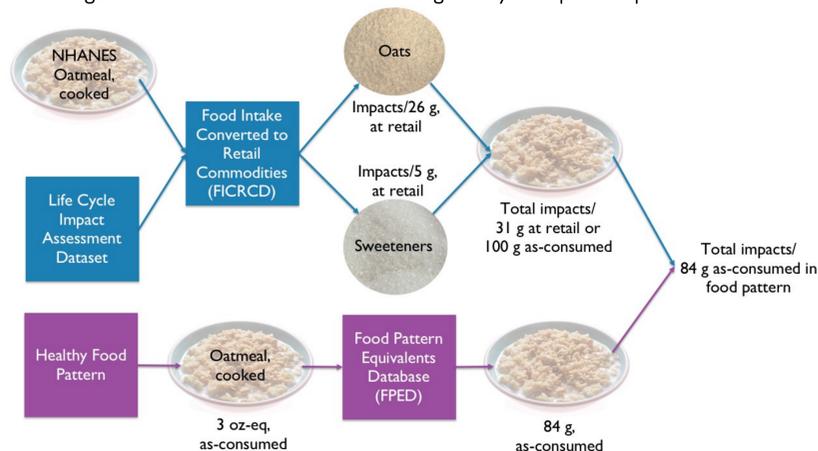
We analyzed the Healthy US-Style (US), Healthy Mediterranean-Style (MED), and Healthy Vegetarian patterns<sup>1</sup> (Table 1). Food groups and subgroups included nutrient-dense versions of 321 commonly-consumed foods, with group composition pre-determined by the U.S. Department of Agriculture using Food Pattern Modeling.<sup>2</sup>

We leveraged multiple datasets<sup>2-8</sup> to assign environmental burdens to foods in the patterns (Figure 1). We mapped 55 unique food life cycle assessments to 63 retail commodities, which were translated to as-consumed foods. Our analysis focused on six impact categories of critical policy importance: climate change, land use, water depletion, freshwater and marine eutrophication, and particulate matter/respiratory organics.

Table 1: Recommended weekly intakes for patterns at 2,000 kcal

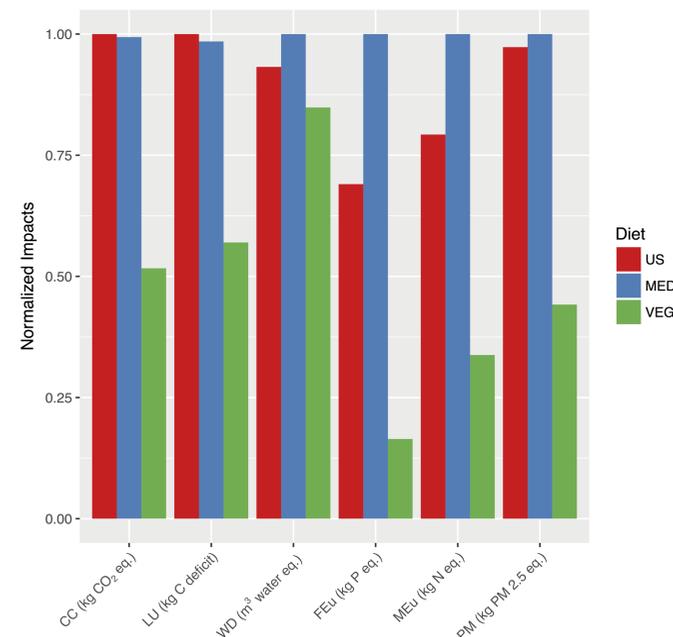
Food Group	Food Pattern		
	Healthy US	Healthy Mediterranean	Healthy Vegetarian
Fruits (c-eq)	14.0	17.5	14.0
Vegetables (c-eq)			
Dark green	1.5	1.5	1.5
Red/orange	5.5	5.5	5.5
Beans and peas	1.5	1.5	1.5
Starchy	5.0	5.0	5.0
Other	4.0	4.0	4.0
Grains (oz-eq)			
Whole	21.0	21.0	24.5
Refined	21.0	21.0	21.0
Protein foods (oz-eq)			
Meat, poultry, eggs	26.0	26.0	3.0
Seafood	8.0	15.0	0.0
Nuts, seeds, soy	5.0	5.0	15.0
Beans and peas	0.0	0.0	6.0
Dairy (c-eq)	21.0	14.0	21.0
Oils (g)	189	189	189
Discretionary limit (kcal)	1890	1820	2030

Figure 1: Process and datasets used to assign life cycle impacts to pattern foods



## Results

Figure 2: Environmental impacts of the healthy patterns in the 2015-2020 DGA

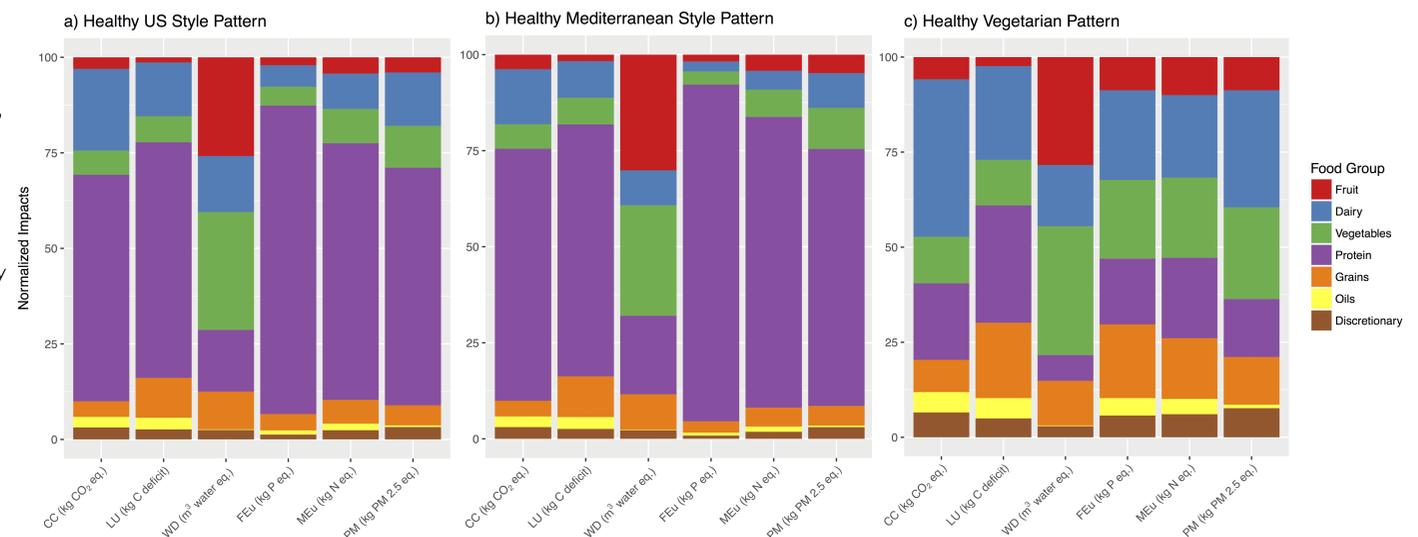


For five of the six impacts, the VEG pattern had dramatically lower burdens (42-84%) than both the US and MED patterns (Figure 2). The protein group was a key driver of these disparities in two ways (Figure 3). First and foremost, reliance on plant-based protein and eggs in the VEG pattern resulted in lower emissions intensities per serving of protein for that pattern (e.g., 0.11 kg CO<sub>2</sub>-eq. for the VEG protein group vs. 0.38 kg CO<sub>2</sub>-eq. for the US protein group). Additionally, the VEG pattern has a much lower protein group recommendation: 24 oz. equivalents of protein per week versus 39 and 46 for the US and MED patterns, respectively.

The US and MED patterns had similar impacts, except for freshwater eutrophication (Figure 2). Freshwater eutrophication was 45% higher in the MED pattern, primarily due to the increased seafood recommendation (88% greater than US). It is important to note that the additional seafood in the MED pattern does not replace other protein foods. Instead, discretionary calories and dairy are lower in the MED pattern compared to the US pattern—resulting in the same calorie and similar nutritional profiles, but dissimilar freshwater quality burdens.

All three patterns had comparable water depletion impacts. Fruits and vegetables, which are recommended in similar amounts across patterns, were major contributors to water depletion (Figure 3).

Figure 3a-c: Food group contributions to the environmental impacts of the healthy patterns in the 2015-2020 DGA



Impacts in the figures are as follows: climate change (CC), land use (LU), water depletion (WD), freshwater (FEu) and marine (MEu) eutrophication, and particulate matter/respiratory inorganics (PM). Impacts were calculated using the International Reference Life Cycle Data System (ILCD) Midpoint+ 2011 method.

## Conclusions

- Recommended patterns in the DGA may have starkly different implications for the environment and other dimensions of food security.
- These findings add to the literature that suggests that healthy diets that are higher in plant-based foods and lower in animal-based foods have environmental benefits.
- Continued interdisciplinary collaboration is necessary to develop guidelines that promote long-term food security.

## References

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