Measurement of diets that are healthy, environmentally sustainable, affordable, and equitable: A scoping review of metrics, findings, and research gaps

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Introduction

Research on the impacts of dietary patterns on human and planetary health is a rapidly growing field. A wide range of metrics, datasets, and analytical techniques has been used to explore the role of dietary choices/constraints in driving greenhouse gas (GHG) emissions, environmental degradation, health and disease outcomes, and the affordability of food baskets. **Many argue that each domain is important, but few have tackled all simultaneously in analyzing diet-outcome relationships**.

This paper takes a four-pillar approach to sustainability encompassing **health, environmental, social, and economic** outcomes. The **L**eading **A S**ustainability **T**ransition **I**n **N**utrition **G**lobally **(LASTING) Project** defines these pillars as:

Pillars	Definition
Health	Outcomes related to diseases or human wellbeing that are associated with meeting nutrient needs, supporting physiological and cognitive growth and development, and promoting wellness.
Environment	The impacts on climate, ecosystems, and natural resources resulting from the production, distribution, consumption, and disposal of food commodities and products that underpin dietary patterns.
Social	The underlying conditions within, and the impacts of food supply chains on, stakeholders who are directly or indirectly affected by food system functions. Stakeholder groups include workers, value chain actors, local communities, society, and children. While the wellbeing of people is most focused-on, the wellbeing of animals is also a concern.
Economic	Outcomes related to economic access by consumers to desired foods, including affordability and relative food prices, as well as the cost of policy actions and the viability of the supply chains and institutions that support all food system functions.

Methods

This paper reviews studies published between January 2015 and December 2021 (inclusive) that examined **dietary patterns in relation to at least two of the following four thematic pillars**: (i) planetary health, including, climate change, environmental quality, and natural resource impacts, (ii) human health and disease, (iii) economic outcomes, including diet cost/affordability, and (iv) social outcomes, e.g., wages, working conditions, and culturally relevant diets. We systematically screened 2,425 publications by title and abstract and included data from **42 eligible publications** in this review.

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Results

- 23 publications examined two pillars; 18 publications examined three pillars; **no publications incorporated all four pillars of sustainability**.
- A total of 226 dietary patterns were identified, with the vast majority being statistically estimated or simulated diets
- 132 outcomes were related to the environment, 95 outcomes were related to health, 46 outcomes were related to economics, and only six were related to social issues
- Only six publications are explicitly focused on LMIC contexts
- A rising number of studies consider **the cost/affordability of dietary scenarios in relation to optimized environmental and health outcomes**
- **Only six publications incorporate social sustainability outcomes**, which represents an under-explored dimension of food system concerns.

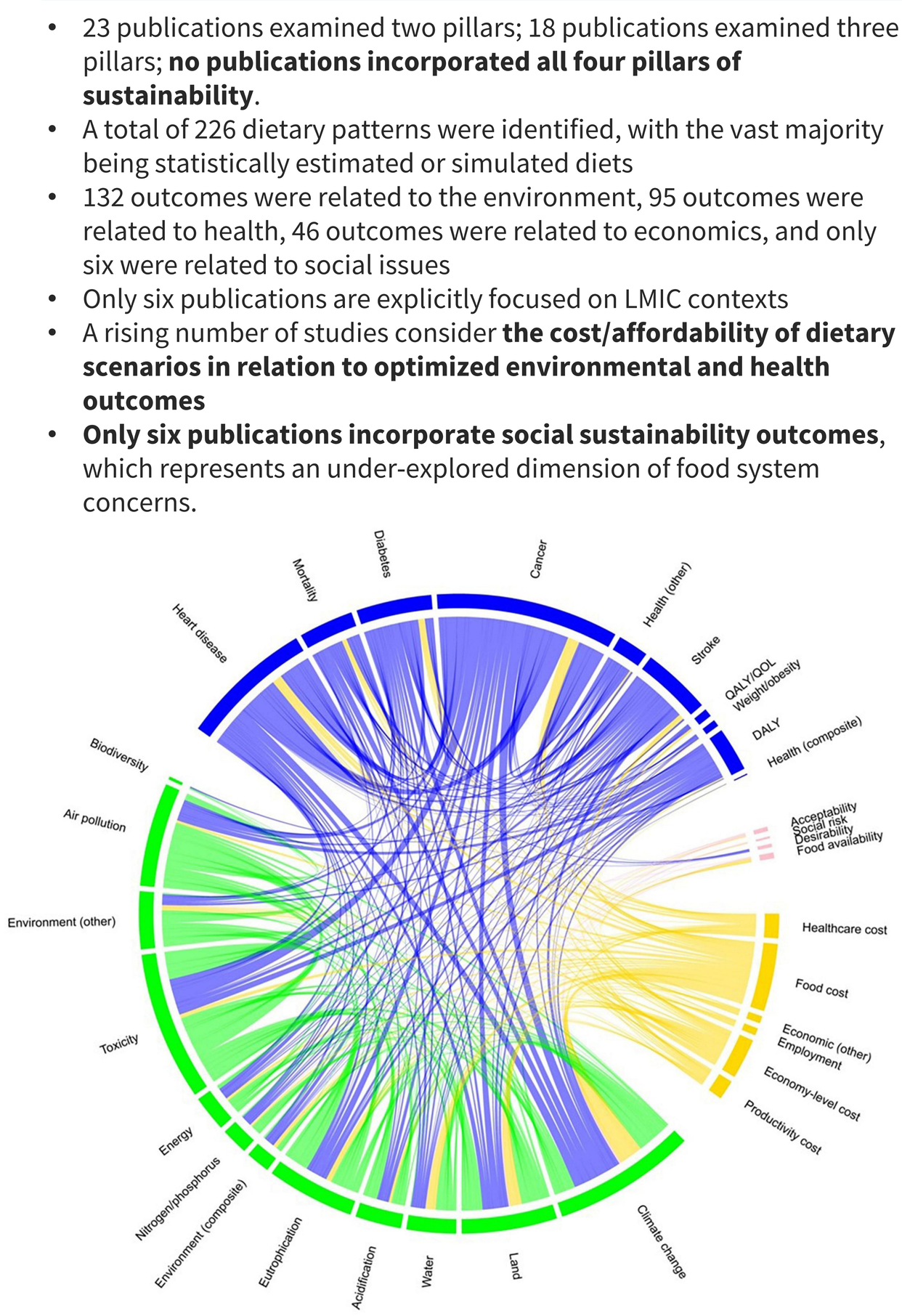

Figure 1. Chord diagram of outcomes

Conclusion

This review suggests a need for:

i. transparency and clarity in datasets used and analytical methods
ii. explicit integration of indicators and metrics linking social and economic issues to the commonly assessed diet-climate planetary ecology relationships
iii. inclusion of data and researchers from LMICs
iv. inclusion of processed food products to reflect the reality of consumer choices globally
v. attention to the implications of findings for policymakers

Better understanding is urgently needed on dietary impacts on all relevant human and planetary domains simultaneously.