

# Development of Sustainability Indicators for Healthy and Sustainable Diets

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## **Abstract**

*The development of sustainability indicators is essential for evaluating diets that are both nutritionally adequate and environmentally sustainable. Research highlights the need to integrate environmental impact metrics with nutritional quality to support sustainable food systems. Studies by Vasiliki Grigoriadis et al. emphasize combining nutrient density with environmental indicators such as greenhouse gas emissions, land use, and water use. Hence, this review was done by searching databases like Google Scholar, ScienceDirect and PubMed using keywords such as sustainability, food choices, nutrition, indicators by applying the time restriction of 5 years from 2021 to 2026. A review by Matthew R. Harrison et al. identifies key indicators across environmental, nutritional, economic, and socio-cultural dimensions. Evidence from Catherine Chen et al. suggests that dietary shifts toward plant-based foods can support sustainability goals while improving health outcomes. Other studies highlight the role of environmental footprints and life-cycle assessment methods in evaluating sustainable dietary patterns. Behavioral factors, including social norms influencing food choices, also contribute to sustainability assessment. Overall, developing integrated indicators is crucial for guiding policies and consumer decisions toward healthier and more sustainable diets globally.*

**Keywords:** *sustainability, food choices, nutrition, indicators*

## **Introduction**

The current global food system is under severe pressure from the increasing population, urbanization, and environmental degradation. There have been changes in dietary patterns around the world as people adopt more animal-source foods and processed foods, which contribute not only to poor health but also to environmental destruction. This includes higher greenhouse gases, water wastage, and destruction of biodiversity. It becomes necessary to move

towards sustainable diets, which not only contribute to good health but also protect the environment. Sustainable diets are those diets that minimize environmental effects, meet nutritional requirements, are affordable economically, and socially acceptable. Measuring sustainability in diets is quite difficult as sustainability involves many dimensions. This has resulted in the identification of sustainability indicators that help to measure various facets of diets.

## **Methodology**

The review was carried out through a systematic literature search in order to find studies that have been conducted within the period 2021 to 2026. The electronic database utilized to gather the scholarly articles included Google Scholar, ScienceDirect, and PubMed. Search terms included sustainability, nutrition, food choices, environmental impact, and sustainability indicators. Articles that discussed sustainable diets and sustainability indicators were considered; however, those that had nothing to do with food and nutrition, as well as those conducted prior to 2021, were disregarded. In all, nine critical articles were chosen for this review.

## **Concept of Sustainable Diets**

Sustainable diets have many dimensions, which are interlinked, and need to be well-balanced in order to achieve sustainable results. The first dimension includes the environment and aims at minimizing the negative effects on nature, whereas the second one concerns meeting dietary needs for important nutrients. In turn, the third dimension deals with cost-effectiveness, and the last but not least one involves socio-cultural aspects. Taking all these dimensions into account and integrating them together is significant in creating proper sustainability indicators, since paying too much attention to one of them might negatively affect the others.

## **Environmental Sustainability Indicators**

The use of environmental indicators becomes imperative when considering the ecological effects of food systems. In this regard, the most common of these is greenhouse gas emissions, which is an effective way to assess the extent to which people's diets contribute to global warming. Animal-sourced foods have more emissions than those sourced from plants, especially red meat. Land use can also be considered an environmental indicator due to the

large quantity of land needed for some foods, resulting in the clearing of land through deforestation. The water footprint indicator is important as it indicates the use of water in food production. This indicator is particularly crucial in areas where there is a water shortage.

### **Nutritional Indicators**

The nutrition quality of food is an important element of sustainable diets, considering that the environment alone is not enough if dietary needs of people are not met. The nutrient density of diets can be evaluated by looking at the quantity of essential nutrients in proportion to their caloric value. Dietary diversity is another metric that is important to consider when measuring the quality of food, as it takes into account the diversity of foods in diets, thus providing a balanced consumption of various nutrients. The health benefits, including the reduction in risks for certain diseases, are used as additional metrics in evaluating diets.

### **Economic Indicators**

The economics behind sustainable diet consumption should not be overlooked when deciding whether a sustainable diet will work for a particular person. Affordability becomes one of the key determinants in choosing which products to buy, especially among poor and middle-class families. The price of healthy and sustainable products may deter individuals from adopting these products into their daily lives. It is, therefore, necessary to examine the economy through economic factors like food prices, income, and spending patterns.

### **Socio-Cultural Indicators**

Dietary behavior and the adoption of sustainable diets are greatly influenced by socio-cultural issues. The choices one makes regarding diet depend on culture, religion, and personal preferences. Cultural acceptability, as a result, becomes an important element in the formation of sustainable diets' indicators. Social norms are another determinant since people have a tendency to match their consumption patterns according to what they believe society does. A recent study shows that changing people's perceptions of social norms leads to more sustainable dietary behavior.

### **Integrated Sustainability Assessment Approaches**

The challenges involved in the assessment of sustainability have prompted research for methods to integrate several criteria into one framework. One method commonly adopted is that of Life Cycle Assessment, which is extensively employed to estimate the environmental

impacts of foods at all stages of their life cycle. Life Cycle Assessment facilitates the measurement of environmental impacts in terms of resources used and emissions produced for each type of food. The concept of Nutritional Life Cycle Assessment adds the aspect of nutritional quality along with other aspects of sustainability and enables a complete assessment. Another technique that integrates several criteria in one index is composite indicator analysis.

### **Sustainable Dietary Patterns**

The sustainability and health impacts of different diets differ greatly. For instance, a plant-based diet has been identified to be more sustainable, not only because of its reduced carbon footprint but also because of its positive health impact on an individual. The plant-based diet involves eating fruits, vegetables, legumes, and grains while minimizing the consumption of meat. Another sustainable diet pattern is the Mediterranean diet. It is known that this diet comprises high levels of fruits and vegetables, moderate amounts of dairy products, and healthy fats like olive oil. On the other hand, the Western diet, involving eating highly processed food products and red meat, has both health and environmental drawbacks.

### **Behavioral and Social Influences**

Behavioral elements have been shown to be very significant in determining the type of diets selected by people and thus whether initiatives for sustainability will be successful or not. Knowledge of the effects of food consumption can have an impact on consumer behavior, but it might not be enough by itself in bringing about change. Food environments, including what foods are available, affordable, and advertised in them, can also affect people's dietary decisions. Other behavioral determinants include the social aspect, whereby the actions of one's peers and society as a whole may lead to certain dietary decisions.

### **Challenges and Limitations**

Although much has been achieved in the creation of sustainability indicators, some challenges persist. The first major problem is the absence of consistent methodologies for indicator development. This limits the ability to compare results across different researches and locations. The availability of data is another issue that could affect the success of the initiative. It can be difficult to find information about both the environmental and nutritional sides of food systems. Regional differences represent another problem that would make it hard to create universal indicators. Sustainability is affected by factors specific to particular areas. There are also conflicting interests involved in achieving sustainability goals.

## Policy Implications and Future Directions

Sustainability indicators hold significant weight for both policymaking and execution. The adoption of these sustainability indicators can aid in the formation of dietary guidelines that also take into account environmental sustainability along with nutrition-related information. Sustainability indicators play a role in public health programs that aim to ensure the improvement of quality diets that are environmentally sustainable as well. Sustainability indicators can help in forming agriculture policies and promoting sustainable food production practices. More research should be conducted for the standardization of frameworks and for taking into consideration the regional context.

## Conclusion

Sustainability indicators play an important role in the assessment and promotion of sustainable diets that are not only healthy but also environmentally friendly. The use of sustainability indicators that integrate the environment, nutrition, economics, and socio-culture is necessary in the evaluation of diets. It is clear that one of the most important strategies that can help improve health and the environment is shifting from meat to plant-based diets. Data and information challenges should be considered in the process of implementing sustainable diets.

## References

Grigoriadis, V., Nugent, A. P. & Brereton, P. (2021). Working towards a combined measure for describing environmental impact and nutritive value of foods: A review. *Trends in Food Science and Technology*, 112.

Harrison, M. R., Palma, G., Buendia, T., Bueno-Tarodo, M., Quell, D. & Hachem, F. (2022). A Scoping Review of Indicators for Sustainable Healthy Diets. *Frontiers in Sustainable Food Systems*.

Chen, C., Chaudhary, A. & Mathys, A. (2022). Dietary Change and Global Sustainable Development Goals. *Frontiers in Sustainable Food Systems*.

Li, Y., Filimonau, V., Wang, L., Cheng, S., Li, Y., Filimonau, V., Wang, L. & Cheng, S. (2023). A set of preliminary indicators for holistic sustainability assessment of household food consumption in rural and urban China. *Resources, Conservation and Recycling*.

*Hatjiathanassiadou, M., Rolim, P. & Seabra, L. M. J. (2023). Nutrition and its footprints: Using environmental indicators to assess the nexus between sustainability and food. Frontiers in Sustainable Food Systems, 6.*

*Kalmpourtzidou, A., Biasini, B., Rosi, A. & Scazzina, F. (2025). Environmental Impact of Current Diets and Alternative Dietary Scenarios Worldwide: A Systematic Review.. Nutrition reviews.*

*Kasper, M., Masri, M. a., Kühn, T., Rohrmann, S., Wirnitzer, K., Leitzmann, M. & Jochem, C. (2025). Sustainable diets and cancer: a systematic review and meta-analysis. EClinicalMedicine.*

*Moojen, R., Gillebaart, M. & de Ridder, D. T. D. (2024). Correcting the Misperceived Social Eating Norm to Dispel Pluralistic Ignorance and Increase Sustainable Food Choices. European Journal of Health Communication, 5(4).*

*Majumdar, S., McLaren, S. J., van der Pols, J. C. & Lister, C. E. (2024). An nLCA approach to support consumer meal decisions: a New Zealand case study of toppings on toast. Frontiers in Sustainable Food Systems.*