

What We Know

Definitions of food sustainability, also referred to as sustainable diets, vary depending on the perspective taken and context in which the term is used. The issue of food sustainability can be viewed through several perspectives: 1) as an issue of food production (there is a need to improve food production efficiency), 2) as an issue of food consumption (excessive food consumption, especially foods that impact the environment the most such as meat and dairy, are the primary cause of food unsustainability), and 3) as a socio-economic issue (meaning that in order to solve the problem of food sustainability, problems of excess and insufficiency in the environment along with health must be better managed)^(1,2,3,4,5,6,8,9,10)

- › The production, processing, packaging, and transportation of most of the food supply are all dependent on the use of fossil fuels and chemical fertilizers. While fossil fuels and chemicals are needed, they can also cause harm to human health and the environment. The processes used throughout the food system lead to ecological impacts such as biodiversity loss (loss of diversity in the ecosystem), climate-forcing emissions (e.g., sulfur and greenhouse gas emissions [GHGEs], nutrient cycle disruption (e.g. the nitrogen cycle in the ecosystem), and competition for land, water and energy resources^(1,6)
- › The food system has a major impact on food sustainability. It encompasses natural resources like land, sun radiation, water, fossil energy, and chemicals. Collectively, these elements produce food for human society. However, the present food system also produces undesirable outputs, which include various forms of solid, liquid, and gas waste such as greenhouse gas emissions GHGEs. It is estimated that direct and indirect impacts of agriculture account for as much as 30% to total GHGE, with the production of different food groups having a greater impact than others ^(2,8)
 - Meat and dairy products are responsible for most GHGE. However, the GHGE from each specific foods varies, and in a study which examined the GHGE produced by different combinations of foods, researchers determined it is possible to create a low GHGE diet that includes some meat and dairy, and has high acceptability^(2,5,9)
 - Research has also indicated that a vegan diet is not as sustainable as vegetarian diets that include dairy products or diets that contain moderate amounts of animal protein.⁽⁶⁾ Further, some researchers have also found that a high nutritional quality diet (as defined by the mean adequacy ratio for 20 key nutrients) is not associated with the lowest GHGEs^(6,9,10)
 - In a study examining the GHGE from vegetarian, semi-vegetarian, and non-vegetarian diets that used data from the Adventist Health Study, researchers found that GHGE were modestly reduced in a semi-vegetarian and vegetarian diet in comparison to a non-vegetarian diet⁽⁹⁾
 - In a study examining the human carrying capacity (persons fed per unit of land area) of U.S. agricultural land, researchers found that a vegetarian diet with dairy products performed the best among 10 diet scenarios, including a vegan diet. Generally, the carrying capacity was higher for diet scenarios without meat; however, the carrying capacity of the vegan diet was lower than two of the diet scenarios that included meat⁽⁶⁾

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–In a study conducted to estimate the GHGEs associated with the consumption of self-selected diets in France and to determine their relationship with nutritional quality of diets, researchers discovered that diets considered to be of high nutritional quality (as measured by mean adequacy ratio of 20 key nutrients) were not the lowest in GHGEs. In this research study, high nutritional quality diets contained more plant-based foods such as fruits and vegetables and included fewer sweets and salted snacks in comparison to low-quality diets. The researchers noted that although plant-based diets of high nutritional quality generally produce less GHGEs, maintaining an isocaloric diet with plant foods only, results in higher GHGEs because of the increased amount of fruits and vegetables required⁽¹⁰⁾

› Meat and dairy products in comparison to plant foods are responsible for the major portion of natural resource utilization and place more environmental burden on food production. For example, researchers have found that on average 11 times more fossil energy is needed to produce animal protein in comparison to plant protein for human consumption. However, meat plays a role in the diet beyond nutritional benefits (for example, meat is a social-cultural norm for some individuals), so if sustainable diets are to be achieved through the reduction of meat consumption, education inclusive of cultural, social, and personal values will need to be included about meat^(4,7,8)

- In a study in Scotland examining participants’ awareness of the environmental impact of food production and their willingness to reduce meat consumption, researchers found that individuals:
 - Lacked awareness of the relationship between meat consumption and climate change,
 - Lacked appreciation for the association between personal meat consumption and its global impact on climate change (meaning that individuals lacked appreciation for the fact that a change in their personal meat consumption would have a significant global impact on climate change and the fact that environmental issues were much bigger than just reducing personal meat consumption), and
 - Were generally resistant to the idea of reducing meat consumption

To help the environment, the Center for Disease Control and Prevention recommends consumers choose food that:⁽¹⁾

- › Does not harm the environment
- › Supports and preserves rural communities
- › Is healthy and nutritious to eat
- › Respects farm animals
- › Provides farmers with a fair wage
- › Is free of added toxins
- › Is grown in the local community
- › Does not harm the health of farm workers

What We Can Do

- › Learn about food sustainability and the environment so you can accurately assess your patient's personal characteristics and health education needs; share this information with your colleagues
- › Where appropriate, educate about ways to plan meals and choose foods that minimize impact to the environment while still providing high nutritional quality
- › Develop an awareness of your own cultural values, beliefs and biases and develop knowledge about the histories, traditions, and values of your clients. Adopt treatment methodologies that reflect the cultural needs of the client

Related Guidelines

- › [The Alliance for Better Food and Farming Guide to Sustainable Foods](#)
- › [Shifting Diets for a Sustainable Food Future](#)

Coding Matrix

References are rated using the following codes, listed in order of strength:

| | | |
|---|---|--|
| M Published meta-analysis | RV Published review of the literature | PP Policies, procedures, protocols |
| SR Published systematic or integrative literature review | RU Published research utilization report | X Practice exemplars, stories, opinions |
| RCT Published research (randomized controlled trial) | QI Published quality improvement report | GI General or background information/texts/reports |
| R Published research (not randomized controlled trial) | L Legislation | U Unpublished research, reviews, poster presentations or other such materials |
| C Case histories, case studies | PGR Published government report | CP Conference proceedings, abstracts, presentation |
| G Published guidelines | PFR Published funded report | |

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